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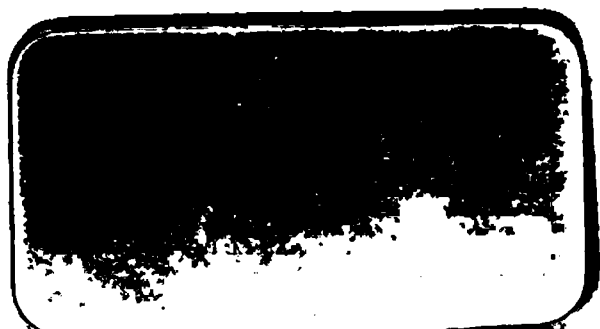
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**ELEMENTS**  
**OF**  
**NATURAL HISTORY.**

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**ELEMENTS**  
**OF**  
**NATURAL HISTORY,**

**FOR THE**

**Use of Schools and Young Persons:**

**COMPRISING**

**THE PRINCIPLES OF CLASSIFICATION,**

**INTERSPERSED WITH**

**AMUSING AND INSTRUCTIVE ORIGINAL ACCOUNTS OF THE  
MOST REMARKABLE ANIMALS.**

**BY**

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**(FORMERLY MRS. T. EDWARD BOWDICH,)**

**AUTHOR OF THE "MEMOIRS OF CUVIER," "TAXIDERMY," ETC.**

**MEMBER OF THE WETTERAVIAN SOCIETY, ETC.**

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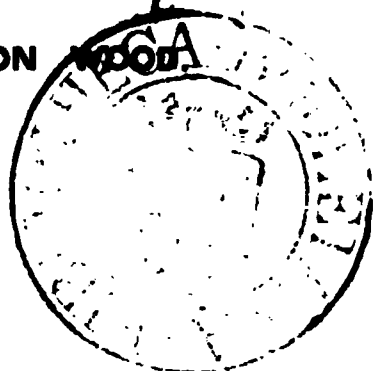
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DEDICATED

TO

RICHARD OWEN, ESQ. F.R.S.

PROFESSOR OF ANATOMY AT THE ROYAL COLLEGE  
OF SURGEONS,

&c. &c. &c.

To be allowed to send forth the following work into the world with the name of Professor Owen at its head, I feel to be the highest sanction which my labours can receive ; but I desire that a dedication of it to him, should be further considered as a public acknowledgment of the kindness which I have received at his hands, and of the respect and friendship which I bear towards him in his private, as well as his scientific life.

S. L.





## PREFACE.

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ALTHOUGH the *Règne Animal* of Baron Cuvier, which now forms the basis of all systematic writings on Natural History, has been ably translated into English, there has, as yet, been no work on this subject adapted to the capacity of the young student. An attempt has been made in the following pages to lay the first four classes of animals before the beginner, in such a manner as shall convey their most important characters, their classification, and economy. At the same time, it is hoped that this book will enable the reader to proceed to the many admirable monographs now published, and the more detailed productions of those whose deep science renders a stepping-stone necessary, to arrive at a full comprehension of their labours.

It was the Author's intention to have included the fossil vertebrata in her pages ; but the narrow limits to which an elementary treatise must necessarily be confined, have entirely banished such notices. As it is, much valuable matter has been suppressed by adhering to the size best calculated for general circulation, — a difficult task where anecdotes crowd

upon each other, and all are interesting to the lover of animals. The selection that has been made is, as much as possible, confined to those facts which have come under the immediate observation of the Author or her friends.

# ELEMENTS OF NATURAL HISTORY.

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THE term Natural History applies to a description of all natural objects, and that branch of it called Zoology, and derived from two Greek words, signifying Life and Discourse, embraces an account of all animal creation: the present work, however, will only contain that portion which includes the four first classes, or those animals which possess a vertebral column.\*

One of the chief ends of education is to obtain a better understanding of the wondrous works of God than we could do without instruction. Natural history is one of the best means of procuring this knowledge; but the objects which it embraces are so numerous, that they cannot be comprehended in one general view. Men of science therefore have formed them into separate groups, to enable the student to take one portion at a time, to which he can confine his attention, without being distracted by the multitude which surrounds him. But these divisions have

\* In other words, a back-bone.

not been made at random, for long and deeply have our predecessors laboured at their task; and, although new discoveries have added to the countless subjects of their researches, yet, as they have also brought with them an increase of knowledge, so improvements have constantly taken place; and as all Creation is laid before us, will continue to reward their endeavours.

Many clever men have invented artificial methods for arranging the animate and inanimate world into groups; but these have been found inadequate; and at last it has been proved, that the best and easiest way is to follow nature herself as closely as possible, and bring those objects together, among which she herself has established the most important and numerous resemblances. This, however, has required the closest study,—the most patient and accurate investigation of every, and even the most minute, part. The difficulties have been further increased by finding that some are alike in one respect, and not at all in another; that their outward forms frequently separate them, while many of their anatomical or internal characters bring them together; till at last, by employing both external and internal formation, the present systems have been established. The last great revolution made in classification is due to the immortal Cuvier, who devoted the larger portion of his life and mighty intellect to Zoology, and founded a system which, as travellers pour new treasures into our museums, and anatomists make new discoveries, may be changed in some of the less important parts, but which is never

likely to be wholly superseded, so firmly is it based on the laws with which an Almighty Hand has stamped his creatures. According to his system therefore, and including the modifications of those who have laboured since his death, will the following work be arranged.

After the great division of all substances into those which live, and those which do not, there comes a second, between the animate and inanimate: the former being sensible and moveable, and the latter possessing neither of these faculties. So closely, however, are these two great divisions drawn together, that, in the present state of our knowledge, it is impossible to mark the precise point at which the separation takes place. It is evident to the commonest observer, that a wide interval occurs between a tree and a lion; but if we take from the lion all his complicated characters, and reduce him to a mere mass of animal jelly, like many of those which live in salt and fresh water; and if we strip the tree of its flowers, its branches, its roots, &c., and bring it down to a vegetable jelly, like various sea-weeds and *confervæ*\*, it will soon be seen how difficult it is for naturalists to determine where animal nature ceases, and vegetable life begins. Leaving this point, however, to those who carry their studies further than we intend to do, we shall proceed to the divisions of the Animal Kingdom.

\* These are found in fresh-water, and frequently appear like floating masses of semi-transparent jelly.

There are four principal forms, or sub-kingdoms, according to which all animals seem to have been modelled; and, whatever may be the necessity for subdividing these still further, the subdivisions only present modifications of these four great leading plans. In the first, the brain and principal trunk of the nervous system\* (or, in common words, the spinal marrow) are enclosed in a bony case, composed of the skull and the vertebræ†, the series formed by the latter being also called the middle column, the spine, or back-bone. To this middle column are joined the ribs and bones, which form the framework of the body, and to the bones are attached the muscles ‡, which put them in motion. Man, and those animals which most resemble him, internally or externally, belong to this form, which is called that of Vertebrated Animals (*Animalia vertebrata*). All have red blood, a muscular heart, a mouth with two jaws, distinct organs of sight, hearing, smell, and taste, never more than four limbs, and are of separate sexes.

The second has no internal framework or skeleton; the muscles are attached to the skin, which is a soft

\* The brain and nerves are formed of a soft substance, which has no apparent motion in itself, but is gifted with the power of conveying impressions to our senses, and will to our muscles.

† To these the common term joints may be applied; they vary in shape and number in different animals, and are perforated, so as to admit the spinal marrow to pass through their whole length.

‡ These muscles are masses of fibres, which have the power of contracting or folding when touched, or when, by means of the nerves, they are put in action, according to our own will.

covering, able to contract or expand in different ways, and in which there are often bony plates or shells. Their nervous system is composed of scattered masses, united by a network of nerves, the principal of which is called the brain. One family alone has been found to possess hearing; but, although taste and sight are common to most, the latter is often wanting. The animals belonging to it vary much more in form among themselves than those of the first, and are called Molluscous animals (*Animalia mollusca*).

Crustacea\*, insects, worms, &c., compose the third form: their nervous system consists of two long chords passing along the belly, and from space to space swelled into knots, the first of which, though not bigger than the rest, is called the brain. Their bodies are always divided into folds, or a certain number of rings, and covered with a hard or a soft substance, to the interior of which the muscles are attached. Most frequently, jointed limbs are fastened to the sides of their bodies; but they are sometimes destitute of these. They are called Articulated Animals (*Animalia articulata*); and, instead of breathing with lungs, or especial organs for that purpose, like the two forms already mentioned, they have gills, or a number of air-vessels spread over their bodies. Most of them have taste and sight, and one family possesses hearing.

\* Crabs, shrimps, &c.



The fourth form is composed of what are termed Radiated Animals (*Animalia radiata*), and, unlike the other three, all of which have the organs of motion, and those of the senses symmetrically disposed on each side, with back and front dissimilar, they have them like rays issuing from a common centre. It is among these that we principally find that similarity to vegetables of which we have before spoken. Having thus briefly traced the four primary divisions, we shall now proceed to the first, which is the immediate object of the present work.

Vertebrated animals, being supported by a framework of bone, are firm and vigorous in their movements; but this framework, though solid in itself, is composed of several pieces fastened to each other in such a manner as to be perfectly flexible. They possess great agility and swiftness, as well as strength, and among them are some of the largest animals in the world. The substance which forms their nervous system is collected into large masses, the central parts of which are the biggest; and from this results a greater force and duration of feeling, and a superior intelligence. Their bodies are always composed of a head, a trunk or body, and members or limbs, the latter of which assume different forms, and are more or less developed. The head consists of a skull, which contains the brain, of a face with two jaws, and the parts in which the organs of the senses are deposited. The body is supported by the spine and ribs. This spine is made of separate pieces or vertebrae, which are moveable. The first bears the head,

and all have a cavity, through which the medullary matter \*, or its substitute, passes from one end of the spine to the other, and from which spring the nerves of the body and limbs. The spine is often prolonged into a tail. The ribs are nearly semicircular, and defend, as well as support, the sides of the body; they are articulated or jointed on to the vertebræ, and a certain number are fastened in the same manner on to the sternum or breast-bone; but there are some ribs which do not reach all the way to the latter, and are called short or false ribs. In some mammalia, these latter are scarcely visible; and one species has an additional pair. Occasionally one pair of limbs is wanting, or even both, and in all cases where they exist, they are admirably adapted to the movements of the animal to which they belong. The fore or anterior members are either hands, feet, wings, or fins. The different modes in which the blood circulates, or receives the air, leads to the four subdivisions of vertebrated animals. They have five external senses, which reside in the eyes, ears, nostrils, coverings of the tongue, and all over the body; but there are some in which the eyes are obliterated. The principal movements of the face lie in the lower jaw, which rises and falls, moves from side to side, or backwards and forwards, and the upper is generally fixed; these jaws are mostly armed with teeth, which

\* Medullary matter means, in common language, spinal marrow; the substitute for it is the albuminous substance which fills the vertebræ of fishes.

are composed of a substance like bone. In birds and tortoises alone they are wholly wanting.

The great intestinal canal, or receptacle for food, goes from one end of the trunk to the other, having, however, in its course, various windings, bends, swellings and contractions, and receiving the different juices necessary to digestion. As the food passes through this alimentary canal, that part of it which is necessary to the nourishment of the body, and called chyle, is sucked up by absorbing vessels, which communicate with the above canal, and carry it to the blood, which flows in the veins. Every part of the body, whether liquid or solid, is composed of chemical substances contained in the blood; but the term nutrition is more particularly applied to the production and deposit of that matter, which is necessary to the increase and support of the solid parts. After dispersing this nourishment over the whole body, the veins bring that which remains of the blood to the heart: but as this remainder, during the operation, acquires a gas which is unwholesome, it passes from the heart into the organs of respiration, in order to receive and be purified by the air; from thence it returns to the heart, which forces it into larger vessels called arteries, which carry it through the body, and from whence it is again taken up by the veins. These organs of respiration in Mammalia, Birds, and full-grown Reptiles, are lungs, or a collection of cells into which the air penetrates. In Fishes, they are branchiæ, or a series of thin plates, between which the water in which these animals live, passes,

and with it conveys the air necessary for the purification of the blood. This circulation exists in considerable force among Mammalia; but in other animals, it is, in a measure, modified, and only a part of the blood receives the air, the rest returning to the body without having passed through the organs of respiration. This is the case with Reptiles. In Fishes, all the air which is received by the animal being that portion which is contained in water, there is even less respiration than in Reptiles. Birds, on the other hand, have a larger proportion than other Vertebrata; for not only is their blood purified by passing through their lungs, but by the air which reaches it through other cavities peculiar to them alone. From these differences of circulation or respiration arise certain peculiarities of movement, depending on the force and activity of the muscles as imparted by the circulation, and cause four principal divisions, called Mammalia, Aves or Birds, Reptilia or Reptiles, and Pisces or Fishes. Bipeds and Quadrupeds, which form the first, with moderate respiration, walk and run. Birds have that lightness and strength of muscle which enables them to fly. Reptiles crawl or creep, and even pass a portion of their lives in a state of complete inactivity; while Fishes require to be altogether supported by a liquid nearly as heavy as themselves. The whole form and structure of the animals in which these differences exist, vary in the same manner, according to the movements which are entailed upon them by their respiration.

At the head of the whole Animal Kingdom, as well as at the head of Vertebrata, do we place the class Mammalia, in consequence of its possessing by far the largest portion of intelligence or understanding, the most delicate sensations, the most complicated structure, and the most varied movements; and for which pre-eminence there is yet another reason, as in it we find Man, to whom dominion was given over all other beings by his merciful Creator. By far the greater number of Mammalia move along the surface of the earth with strength and vigour, the exceptions to these being a few which have the power of moving in the air or water, but which retain all the distinguishing characters of the class. The name of Mammalia has been given to them from the power which all possess of suckling their young with a liquid peculiar to them, called milk; and which is contained in mammæ or breasts. They all have warm blood, which is one of the results of their respiration: they are viviparous, or give birth to living young ones; but the offsprings of one portion are born so little formed as to be incapable of motion, and have scarcely any appearance of those limbs and external organs which they afterwards possess. These are called ovo-viviparous by naturalists, that is, living, and yet to be compared to those animals which leave their mother while enveloped in an egg.

The essential differences between Mammalia lie in their organs of touch or prehension\*, or those of

\* Taking hold.

mastication, which bring with them not only various degrees of agility and skill in taking their food, but determine the nature of that food. They also cause certain modifications in the digestive organs and degrees of intelligence. The perfection of touch resides in those animals which have their extremities divided into fingers; and this sense must necessarily be blunted when these extremities are enveloped in a hoof. In order to masticate flesh, the grinders must cut like a saw, and be furnished with tubercles or projections, and the jaws open and shut like a pair of scissors; but, in order to bruise seeds, leaves, or roots, the grinders must have flat tops, and the jaws move horizontally, or from side to side. Consequently, animals with hoofs will possess the latter, because, their extremities being unable to seize living prey, they are obliged to live on vegetables or herbaceous food. Teeth are called grinders, incisors, and canines. The first are commonly known by the name of double teeth; the second are those which are placed in the front of each jaw, and are sharp and cutting; and the third are those pointed teeth on each side of the incisors which divide them from the grinders.

The annexed table sets forth the main divisions of the class Mammalia into nine orders: the terms order, family, genus, sub-genus, &c., employed for these and other divisions being those agreed upon by naturalists to designate the degrees of importance attached to the characters which unite or separate the groups.

# TABLE I. ANIMAL KINGDOM.

## CLASS I. MAMMALIA.

### ORDERS.

- |   |   |
|---|---|
| <p>Order 1. <b>BIMANA</b>, or Two-handed Animals; as <b>MAN</b>.</p>                  | <p>Nails and pliable fingers. Great toes longer than the others, but unable to move in a direction opposed to the latter. Three sorts of teeth, incisors, canines, and grinders.</p>  |
| <p>Order 2. <b>QUADRUMANA</b>, or Four-handed Animals; as Apes, Monkeys, &amp;c.</p>  | <p>Nails and pliable fingers. Great toes or thumbs of the hind feet shorter, and moveable in an opposite direction to the other fingers, which are long and flexible, like those of the fore feet or hands. Three sorts of teeth.</p>                                     |
| <p>Order 3. <b>CARNIVORA</b>, or Beasts of Prey; as Lions, Tigers, &amp;c.</p>        | <p>Nails and pliable fingers or toes. No opposing thumb or great toe on either of the extremities. Three sorts of teeth. Jaws possessing only the power of opening and shutting, <i>i. e.</i> having no horizontal movement.</p>  |
| <p>Order 4. <b>MARSUPIALIA</b>, or Pouch Animals; as Kangaroos, Opossums, &amp;c.</p> | <p>Teeth and extremities varying much, so as to lead to a resemblance with Carnivora, Rodentia and Edentata, but all united by the common character of their young being born in an imperfect state, and remaining in the pouch of their mother till fully developed.</p> |

- Order 5. RODENTIA, or Gnawing Animals; as Rats, Mice, &c. Nails and pliable fingers. No canines. Incisors formed for a peculiar mode of feeding. The lower jaw moves only backwards and forwards.
- Order 6. EDENTATA, or Animals wanting some of the teeth of other orders; as Ant-Eaters, &c. Large nails enveloping the extremities of the toes, and approaching to small hoofs. No incisors. Some without canines.
- Order 7. PACHYDERMATA, or Thick-hided Animals; as Rhinoceroses, &c. One or more hoofs. Fingers or toes immoveable. Teeth varying.
- Order 8. RUMINANTIA, or Ruminating Animals; as Cows, Sheep, &c. Two hoofs. No incisors in the upper jaw. Canines generally wanting. Four stomachs.
- Order 9. CETACEA, or the Whale tribe. No hind feet. No incisors. No canines.

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## ORDER I. BIMANA.

MAN, the most privileged of all animals, offers but one genus: his great toe, longer and thicker than the rest, is always placed on the same line with the other toes; his feet are wide, and flat underneath, and, with his enlarged heel bone, admirably fit him for walking; the leg is placed vertically upon this foot; the muscles of it are large and strong; and the bones to which the thighs are articulated (jointed), called the pelvis or basin, are so wide, that they keep the legs apart from each other. From the middle of this basin rises the vertebral column, or back-bone, on the top of which is placed the head, so that his skeleton or frame presents a pyramidal form, eminently



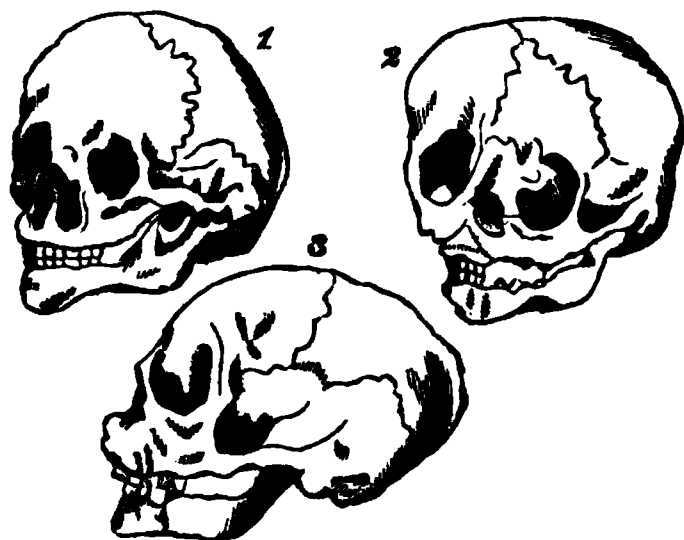
adapted to insure strength, firmness, and equilibrium, in the upright position for which he is made. Thus supported, he has no occasion to use his other members for the purposes of motion. His senses being situated in his head, at the top of the column, enable him to observe quickly, and his hands and arms obey their dictates. The structure of his hands is calculated to give him great dexterity ; his thumb, comparatively long, and opposed to the other fingers, and the free movement of all his fingers except the third, enable him to take hold of the most minute objects. His nails only cover one side of his fingers at the tips, and strengthen his touch while they do not interfere with its delicacy. His arms are fortified by the shoulder-blade and collar bones. It is not, however, in strength that man has the advantage over other animals ; nor in swiftness ; his jaws do not project, his canine teeth are neither long nor prominent, nor are his nails strong and hooked ; he has neither bristles, nor even fur upon his body ; his senses are not particularly acute, when compared with those of many below him in the scale of creation : and yet, without natural offensive or defensive weapons, he rules over all, and subjects the strongest and most ferocious inhabitants of the earth to his power. It is in the structure of his brain that he finds all his resources ; for although his sight is limited to a comparatively small distance, it is able to fix itself for a length of time, and by so doing convey the strongest impressions to the brain. Although the external part of his ear or conch is small, and scarcely moveable, yet he is, of

all others most capable of distinguishing intonations. Although his nostrils are less complicated than those of other Mammalia, he is much affected by disagreeable or unwholesome smells. His taste, however, is delicate, for his tongue is smooth and fleshy, and in voice he is preeminent, he alone being able to communicate his thoughts by means of words. His short jaws, his canines, equal in length to his other teeth, and his tuberculous grinders, show that he is chiefly formed for cooked and vegetable food, for he can neither graze nor tear raw flesh ; hence he has been often styled a “ cooking animal.” His organs of digestion are conformable to those of mastication, and are extremely simple. He has thirty-two vertebræ in his back-bone ; he has seven pairs of ribs, which unite this column to the sternum, and five pairs of short or false ribs. Each jaw has sixteen teeth : four cutting incisors in front, two pointed canines, one on each side of the incisors, and ten grinders or molars with tuberculous tops or crowns, five on each side. He has two mammæ or breasts, and the female, when suckling her child, holds it to these breasts with her arms. Generally speaking, she has but one child at a birth. The first set of teeth, or what are called milk teeth, begin to appear some months after birth, and commence with the incisors ; at two years of age there are almost always twenty, which fall out about the seventh year, and are replaced by others ; twelve of the grinders do not fall out, the four last of which are not cut till the eighteenth or twentieth year. A child when born is generally more than a quarter of the height which it

will eventually attain ; at two and a half it is half its height ; and at eighteen or twenty it ceases to grow, and females are generally less than males. When the body has attained its full height it generally begins to thicken ; and as years increase, the different vessels gradually become obstructed, and the solid parts become stiff. Then ensue old age, decrepitude, and death. Unlike other animals, the young of the human race require a mother's care long after they have done sucking, and education of the mind and body go on together : mutual aid is often required throughout life, and hence there is unceasing attachment between parents and children. It is difficult to say how far instinct goes and where reason begins, but we know that man has less instinct than other animals. They, at their birth, exercise those movements which are necessary to supply their wants and preserve their existence. Spiders spin their web and extend their nets ; chickens wear away their shell, and pick up their food the moment they are freed from their covering : but these operations are not the result of reason ; they do not become more perfect, and the more instinct animals display, the less do they appear to be gifted with reason. The child has but very little instinct in its earliest age, and scarcely shows more when it can speak. All the knowledge of man is the result of his own sensations, or those of his predecessors : transmitted by speech, matured by meditation, applied to his wants and enjoyments, they have furnished all his arts ; and speech and writing, by preserving the knowledge already acquired, are sources of indefinite perfection.

Genus I. HOMO. *Man, Homme.*

Although the human species appears to be unique, we may observe certain hereditary conformations, which constitute what are called Races. Three of these are eminently distinct: the White or Caucasian; the Yellow or Mongolian, and the Negro or Ethiopian. The Caucasian, to which we Europeans belong, is distinguished by the beautiful oval form of the head (*fig. 1.*). It is this race which has given



birth to the most civilised people, and to those who have generally ruled over others. It varies in complexion, and the colour of the hair. Its moral feelings and intellect are of the highest kind, and capable of the greatest developement.

The Mongolian is recognised by its projecting cheek bones, which are on a line with the nose (*fig. 2*), flat face, narrow and oblique eyes, straight and black hair, thin beard, and olive complexion. It has formed the great Empires of China and Japan, and has sometimes extended its conquests on this side

of the great plain of Asia, but its civilisation has always remained stationary.

The Negro race is confined to the south of the Atlas mountains: its compressed \* skull, flattened nose, projecting muzzle, and thick lips, particularly the upper one, evidently approach the Apes. The nations which compose it have always remained barbarous (*fig. 3.*).

We have called the race from which we descend Caucasian, because the traditions and genealogies of the people seem to carry them back to the group of mountains situated between the Caspian and Black Seas. We may distinguish the principal branches of this race by the analogy of their languages. The Armenian branch, or that of Syria, directed itself to the south, and produced the Assyrians, Chaldeans, the unsubdued Arabians, who once hoped to become masters of the world, the Phœnicians, the Jews, and the Abyssinians, and it is very probable that the Egyptians belonged to it. It is in this branch, always inclined to mysticism, that the most extended religions have originated. Sciences and letters have sometimes flourished in it, but always under whimsical forms, and a figurative style.

The Indian, German, or Pelasgic branch, is much more extended, and was much more anciently divided; nevertheless we find numerous affinities between its four principal languages: the Sanscrit, now the sacred tongue of the Hindoos, and the mother of all the

\* As if squeezed together.

languages of Hindostan ; the ancient language of the Pelasgi, the mother of the Greek, Latin, and many extinct languages, and of all which now exist in the south of Europe; the Gothic or Teutonic, from whence the languages of the north and north-west are derived, such as the German, Dutch, English, Danish, Swedish, and their dialects ; lastly, the Sclavonic, the mother of those of the north-east, or the Russian, Polish, Bohemian, and Vendean.

It is this great and respectable branch of the Caucasian race which has carried philosophy, science, and art to the highest pitch, and has been the depository of each for thirty ages. It was preceded in Europe by the Celts (the nations of which, originally from the north, and formerly much extended, are now confined to the most western points), and by the Cantabrians, who passed from Africa into Spain, and are now almost lost amid the numerous nations whose descendants are mingled together in that peninsula.

The ancient Persians have the same origin as the Indians, and their descendants still retain the strongest marks of affinity with the people of Europe.

The Scythian and Tartar branch, first directed to the north and north-east, always wandering in the immense plains of those countries, only returned to devastate the happier establishments of their brethren. The Scythians, who so anciently made irruptions into Upper Asia, the Parthians, who there destroyed the Greek and Roman power, the Turks, who overthrew that of the Arabs, and in Europe subjugated the unfortunate remains of the Greek nation, are swarms

from this branch. The Finlanders and Hungarians, who belong to it, are in some measure confounded with the Slavonic and Teutonic nations. The north-east of the Caspian Sea, their original country, still nourishes people who have the same origin, and speak similar languages; but they are intermingled with an infinity of other small nations of different origins and tongues. The Tartars remained more pure throughout the region whence they so long menaced Russia, and in which they were at last subjugated by her; that is, from the mouths of the Danube to beyond the Irtisch. The Mongolians, however, in their conquests, have mingled their blood with the Tartars, and we detect numerous traces of them, especially among the people of Little Tartary.

The Mongolian race commences to the east of this Tartar branch of the Caucasian, and runs to the Eastern Ocean; its branches, still nomade, the Kal-mucs and Kalkas, traverse the Great Plain. Three times their ancestors, under Attila, under Gengis, and under Tamerlane, spread afar the terror of their name. The Chinese were the most anciently civilised, not only of this branch, but of all known people. A third branch (the Mandchous) has conquered China, and still governs it. The Japanese, the Coreans, and almost all the hordes which extend to the north-east of Siberia, under the Russian power, also, in a great part, belong to it. If we except some learned Chinese, the whole of the Mongolian race follows the different sects of Buddhism, or the worship of Fo.

The origin of this great race appears to have been

in the Altaic mountains, as ours sprang in the Caucasian; but it is not possible to follow equally well the filiation of its different branches. The history of all these wandering people is as fugitive as their colonies; and that of the Chinese, concentrated in their empire, has hitherto afforded only brief and abrupt notices of the neighbouring people. The affinities of their languages are also too little known to guide us in this labyrinth.

The languages of the north of the peninsula beyond the Ganges have, as well as those of Thibet, some affinity to the Chinese, at least by their monosyllabic nature; and the people who speak them are not without resemblance to the other Mongolians in their features: but the south of this peninsula is inhabited by Malays, a much handsomer people, whose race and language are spread on the coasts of all the islands of the Indian Archipelago, and who have occupied almost all those of the South Sea. In the largest of the former islands, especially in the wildest parts of them, dwell another people, with woolly hair, black complexion, and negro countenance, all more or less barbarous. The best known bear the name of Papoos, under which we may generalise them. Neither these Malays nor Papoos can be easily traced to either of the three great races. But can the first be clearly distinguished from their neighbours on each side of them — the Caucasian Indians, and the Chinese Mongolians? We must confess, that we have not yet found a sufficient number of characters to distinguish them. Are the



Papoos Negroes who have anciently wandered on the Indian seas? Years have elapsed since these questions were first suggested, and, as yet, we have no clue to their solution.

The inhabitants of the north of the two continents, the Samoiedes, the Laplanders, and the Esquimaux, have sprung, according to some authors, from the Mongolian race; according to others, they are but degenerate shoots of the Scythian and Tartar branch of the Caucasian.

The Americans have not yet been clearly referred to either of the races of the ancient continent; nevertheless, they have no character sufficiently marked and constant to make them a distinct race. The late discoveries of their ruined temples, whereon are figured many effigies of human features, fail to enlighten us. The copper complexion of their descendants is not enough: their hair, generally black, and their thin beard, would refer them to the Mongolians, if their well-marked features and projecting nose did not oppose it. Their languages also are as innumerable as their nations, and we have not yet been able to detect analogy, either between these languages themselves, or between them and the languages of the Old World.

The frozen climates to the north of the two continents, and the impenetrable forests of America, are still inhabited by savage hunters or fishermen. The immense sandy or salt deserts in the centre of Asia and Africa are covered by shepherd people and innumerable flocks. These hordes, half-civilised,

assemble whenever an enthusiastic chieftain summons them, and pour upon the civilised countries which surround them, to establish and enervate themselves therein, until other pastors succeed and subjugate them. This is the true cause of the despotism which has in all ages crushed the industry of those who inhabit the beautiful climes of Persia and India.

Mild climates, soils naturally watered and rich in vegetables, are the true cradles of agriculture and civilisation, and, when their position shelters them from the irruptions of barbarians, every sort of knowledge is cultivated. Such were, first of all, Greece and Italy in Europe; such is now almost all this happy part of the world. There are, however, some innate causes, besides those above mentioned, which appear to arrest the progress of certain races, even under the most favourable circumstances.

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## ORDER II. QUADRUMANA.

THE anatomy of this order resembles that of man, with the following sensible differences: the hind feet have free, opposable thumbs, like those of the hands\*, and all the toes are long and flexible; the basin or pelvis is more contracted, and the heel bone is narrower, so that, although many species walk upright, they have not the firm step or equilibrium of man;

\* From this character they have been named *Quadrumana*, or *Four-handed*.

they, however, climb trees with the greatest facility: The projecting muzzles of some of the species, and the back-bone prolonged into a tail, gradually distance them from the human species; but the free action of their arms, and their hands, formed for prehension (or taking hold), entail similar actions and gestures. They are divided by naturalists into three genera. (See TABLE II.)

## TABLE II.

## ORDER II. QUADRUMANA.

GENUS I. SIMIA. *Apes, Singes.*

Division 1. *Apes of the Old World*—Two false grinders; nose narrow.

Division 2. *Apes of the New World.*—Three false grinders; nose broad.

Division 1. *Apes of the Old World.*

## Tribe 1. APES PROPER.

Subgenus 1. ORANG. *Simia, Pithecus, Wild Man of the Woods, Jocko, Pongo, Hommes sauvages.*—No hard substances or callosities on their buttocks; nose even with the face; no pouches; no tail.

2. HYLOBATES. *Gibbon, Long-armed Ape.*—Very long arms; low forehead; callosities; no tail; no pouches.

3. CERCOPITHECUS. *Tailed Monkeys, Guenons, Singes à Queue.*—Muzzle moderately projecting; pouches; tail; callosities; the last grinder below with four tubercles like the others.

**Subgenus 4. SEMNOPITHECUS. *Solemn Apes, Semnopithèques.***

— An additional tubercle on the last lower grinder; very long limbs and tail; callosities.

5. **MACACUS. *Macaques.*** — Lower grinders of the preceding; callosities and pouches; limbs thicker and shorter than the above; muzzle more projecting; bone over the eyebrows prominent.

6. **INUUS. *Magots.*** — Characters of the preceding subgenus; but a small tubercle instead of a tail.

7. **CYNOCEPHALUS. *Baboon, Papio, Cynocephales.*** — Muzzle elongated, and as if cut off abruptly, or truncated at the end, in which the nostrils are pierced; teeth, pouches, and callosities of the preceding.

8. **MANDRILL. *Boggo.*** — Muzzle longer than that of any other ape; very short tail; nose and nostrils like the preceding.

The name of Orang is taken from a Malay word signifying a reasonable being, and which is equally applied to man, the above ape, and to the elephant. The specific name of Outang is also a Malay term, meaning wild man, or man of the woods. Orangs more nearly approach man than any of the other Quadrumana, and live chiefly on fruits, but occasionally eat insects, reptiles, mollusca, and eggs. Their large canine teeth furnish them with a powerful weapon which is denied to the human race, and require a void space in each jaw, opposite to them, in which they may lodge when the mouth is closed. These, and all the apes of the Old World, have the same number of grinders as man. Some of them

have arms so long as to touch the ground when the Orang is upright. The Orang-outang comes from Asia, and age takes from it much of its outward resemblance to man, by greatly elongating the lower part of the face, or the muzzle. Its body is covered with coarse, reddish hair; its face has a blue tint, and the thumbs of the feet are short in comparison with the other fingers. It has a singular power of projecting its lips, and when young is very docile and easily tamed; but its intelligence has been greatly exaggerated, being inferior to that of the dog. Its powers of imitation probably afford foundation for many of the marvellous stories told of its actions. The Pongo from Borneo approaches the height of man, and its heel-bone is so much enlarged, that it is able to walk upright better than any other species.

The Chimpanzee (*Simia troglodytes*) is an African animal, has scarcely any forehead, and is covered with black or brown hair, except in the front of the body, which is nearly naked. It is very easily tamed, and can be made to eat and drink with knife, fork, and cup. Mr. Bowdich, the African traveller, says that the Chimpanzee which he had in his possession for a short time was remarkably affectionate and docile. It frequently uttered a cry like that of a feeble old man, and its hobbling gait, and apparent distress on finding itself amid strangers, were painful to witness: no sooner, however, did it hear the voice of its former master, than it rushed towards him with delight, and, throwing its arms about his neck, could scarcely be separated from him. It was very young, and was

three feet high, and its agony at the sight of a panther on board the same vessel, showed that it was in the presence of a mortal enemy. The panther's back bristled up, his tail swelled, and it was thought at one time that he would tear the iron bars from his cage, so great was his fury; while the Chimpanzee bounded swiftly along the deck, overturning everything in its way, and stopped not till it found a sail, in which it completely enveloped itself. Mr. Bowdich was the first to report the existence of a large species which exists in Tropical Africa, and which is called *Ingheena* by the people of those countries. It was long thought that he had been imposed on by the natives; but the arrival of a male and female at the College of Surgeons, about two years back, verified every description of its size and strength. A person in Bristol wished to procure living examples of this formidable creature, and commissioned the master of a trading vessel to bring them for him. Finding it impossible to get them alive, (and the natives say they never yet were taken while living,) the captain brought them home dead: the male he put into a cask of rum, and the female into the strongest possible brine. The person who gave the commission, however, refused to purchase them in this state, and Professor Owen secured them for the College. The male (*fig. 4*) is in good preservation, but the flesh dropped from the bones of the female: the former is nearly five feet high, and three feet across the shoulders; his wrist is twice as thick as that of an ordinary man, and his canines are enormous; his grinders


show that he lives upon fruit, and probably roots, and what is singular, he has one more pair of short ribs than man possesses. The natives on the shores of the Gaboon river declare, that these creatures lurk among the trees, near frequented paths, in order to destroy passengers, and that one blow of their hand is sufficient to destroy life. They feed much upon wild honey, and are said to build huts, but live and sleep on the outside ; and, from having seen men carry bur-

thens, they tear down large branches of trees, or pick up tusks of elephants, which they find by chance, and shouldering them, walk about with their load till they drop from fatigue. When their young ones die, the mothers carry them about, closely pressed to them, till they fall from putrefaction.

Among the Gibbons we may distinguish the Siamang (*Simia syndactyla*), which has the first joint of the second and third toe united by a skin or membrane. It is black, with red chin and eyebrows, and lives in numerous herds, which are governed by courageous chiefs; and at the rising and setting of the sun they make the forest resound with their hideous cries. Although destitute of pouches\*, Mr. Bennett mentions an "air sac" under the chin; and we add his description of one of these Gibbons, as contained in Mr. Loudon's *Magazine of Natural History*. "The animal had been recently brought by a Malay lad from the interior of Sumatra, and the Malays at Singapore call it "Ungka." He invariably walked in an erect posture when on a level surface, and then his arms hung down, enabling him sometimes to assist himself with his knuckles, or, what was more usual, he kept his arms uplifted in a straight line above his head, with the hands pendent, ready to seize a rope, and climb up on the approach of danger, or obtrusion of strangers (*fig. 5*). He preferred vegetable diet, such as rice, plantain, &c., and was ravenously fond of car-

\* These are prolongations of the skin of the cheek, and used for secreting food. In them a stock of provisions will be carried about for hours, and then devoured.





rots. He would drink tea, coffee, and chocolate, but neither wine nor spirits. He liked fowl better than any other animal food; but a lizard having been caught on board, and placed before him, he took it immediately in his paw, and greedily devoured it. When pleased, he uttered a peculiar squeak, and when angry or frightened, or when chastised, the loud guttural sounds of *ra, ra, ra*. When I approached him for the first time every morning, he greeted me with chirping notes, advancing his face at the same time,

as if he intended a salutation. He had great gravity of look and mildness of manner, and was deficient in those little mischievous tricks so peculiar to the monkey tribe. In only one instance did I experience mischief from him, and that was in his meddling with my inkstand; he had a fancy for the black fluid, and would drink it, and suck the pens whenever an opportunity offered. He soon knew his name, and came to those who called him. He preferred children to adults, and became particularly attached to a little Papuan child. They were often seen sitting near the capstan, his long paw round her neck, lovingly eating biscuit together. When tired of romping or playing, he would gently bite her, and so terminate the sport. He was desirous of becoming acquainted with the other monkeys on board, but they refusing his advances, he punished them by dragging them about by their tails. However, after they had united against him in their own defence, he was obliged to relinquish this, and applied his efforts to the curled tail of a pig, which he frequently endeavoured to straighten. He always took his station in the cuddy at dinner-time, and if laughed at when eating, he vented his indignation by barking and inflating the air sac under his chin, regarding the person who ridiculed him with a serious look until he had ceased, when he would quietly resume his meal. When shut up he would display great ebullitions of temper, but would be quiet when released. He could not endure disappointment, and when refused anything, would act like a spoiled child; lie on deck, roll about, throw his legs

and arms in various directions, dash about everything that might be within his reach, walk about, repeat the same scene as before, uttering during the time *ra, ra, ra*; but coercive measures employed during the paroxysms reduced him in a short time to obedience, and this temper was in a measure checked. He was very fond of sweet things, and also of onions, although they made him sneeze and loll out his tongue. He was cautious of approaching strangers, and would not permit a lady who came on board to come near him. He suffered much from cold, although clothed in flannel, and died from change of climate before he reached England."

Numerous species of *Cercopithecus* overrun Africa. The author of this work possessed one from the Gambia, which was grey and yellow, and which evinced great attachment and intelligence, but was abominably mischievous, and was never let loose without committing some misdemeanour, such as breaking everything he could dash to the ground, and deliberately tearing all yielding materials to pieces, &c. He was brought to London, and afterwards taken to the Jardin du Roi in Paris, where, after an absence of two years, he recognised his mistress by the sound of her voice, and furiously shook the bars of his cage till she came to him, when he instantly held his head down for her to rub it. But the most amusing of all monkeys was Jack from Senegal (also a *Cercopithecus*), who belonged to the cook of the vessel in which the author sailed to England. She was one day sitting alone on the deck, in a dead

calm, when Jack, whom she had never before noticed, suddenly jumped upon her shoulders, and chattered in her face; she sat perfectly still, although very much inclined to shake him off; he then descended into her lap, and examined the rings on her fingers with the greatest attention, every now and then looking into her face; and from that moment she was his especial favourite. He was often banished to an empty hen-coop when he was particularly troublesome, from which she so constantly rescued him, that whenever he had done wrong, he would take refuge with and hide himself close to her. She by accident discovered that he was much alarmed at the sight of the panther before mentioned, and when he was naughty, she would hold him up by the tail, in the front of the cage: but long before he reached it, knowing where he was going, he pretended to be dead; his eyes were closed, and every limb was stiffened. When taken away, he would open one eye to see whereabouts he might be, and if he caught a glimpse of the cage, he again became motionless. He clambered into the hammocks of the men, stole their knives, tools, and handkerchiefs, and even the caps off their heads, all of which went into the sea. When biscuit was toasting, or dried herbs boiling in tin mugs for the sailors, he would take the former from between the bars of the grate, and taking out the latter, trail them along the planks: if he burnt his paws, he desisted only for a day or two, and he often regaled the parrots on board with the biscuit, biting it into small pieces, and feeding

them with the utmost gravity. At other times he would knock over their cages, lick up the water which ran from their troughs, eat the sugar which now and then rolled out, and pull the tails of the birds. For killing a pigeon in this manner he was imprisoned for three days, and half an hour after he was released, he was seen scampering about the deck, with two blue-faced monkeys upon his back, to whom he often gave a ride. When he himself wished to ride, he would watch for the letting loose of the pigs, dart on to their backs from behind a cask as they passed, dig his nails into them to make his hold firm, and the faster they ran, and the more they squealed, the happier he seemed to be. His worst tricks, however, were performed to the injury of the other monkeys on board: he would call those who were less than himself by making a peculiar noise, when they would come to him, hanging their heads and showing every mark of obsequiousness; and he drowned two of them out of jealousy. During one of the calms so often met with in the tropical seas, the men had been painting the outside of the ship, and, leaving their pots and brushes on the deck, went down to dinner. Jack beckoned and coaxed a poor little black monkey to him, then, seizing him by the neck, took a brush full of white paint, and covered him with it from head to foot; the helmsman and the author burst into a laugh, when Jack dropped his victim, and climbed into the maintop, where he stood with his nose between the bars, peeping at all that was going on below. Many attempts were

made to catch him, but he eluded them all, and did not venture down till hunger pressed him, when he watched an opportunity of dropping into the lap of his friend, who procured his forgiveness.

The Magots are those monkeys which are found on the rock of Gibraltar, having passed over to that place from Barbary.

The Baboons are some of the most ferocious animals in the world, and the Mandrills are scarcely less savage. The latter attain the height of man, and are conspicuous for their hideous appearance, many of them having a bright scarlet nose, others a chin of the same colour.

### TABLE III.

#### ORDER II. QUADRUMANA.

##### GENUS I. SIMIA.

##### Division 2. *Apes of the New World.*

- Tribe 1. **SAPAJOO.** — Four grinders more than other apes; tail long and prehensile; no pouches; no callosities; nostrils pierced at the side of the nose.
- Tribe 2. **SAKI.** — Grinders; pouches; callosities; and nostrils as above; but tail not prehensile.

##### Tribe 1. **SAPAJOO.**

- Subgenus 1. **MYCETES.** *Howler, Alouattes.* — Head pyramidal; upper jaw descends much lower than the skull; the lower jaw branches upwards; prehensile part of tail naked.
2. **CEBUS.** *Sapajoo Proper.* — Head flat; muzzle but little prominent.

3. **ATELES.** *Spider Monkeys.* — Thumbs of the fore hands entirely, or partially hidden under the skin ; prehensile part of the tail naked.
4. **GASTRIMARGUS.** *Lagothrix, Gluttonous Monkey.* — Head round ; tail partially naked.
5. **SAJOO.** *Weepers.* — Head round ; thumbs distinct ; tail hairy.
6. **SAMIRIS.** — Tail depressed ; scarcely prehensile ; head very flat.

### Tribe 2. SAKI.

- Subgenus 1. **PITHECIA.** *Fox-tailed Ape.* — Tail very long and tufted ; teeth projecting in front.
2. **CALLITHRIX.** *Sagouins.* — Tail slender ; teeth not projecting.
  3. **NYCTIPITHECUS.** *Nocthores.* — Large nocturnal eyes ; ear partially hidden by the fur.

In the division of Apes of the New World (TABLE III.) we find four more grinders than in the first division, making 36 teeth in all. These apes have no pouches, no callosities ; their tails are long and sometimes prehensile, and their nostrils are pierced at the sides of the nose, instead of underneath. Among the first tribe, or that of the Sapajoes, we find the Howlers, or Mycetes, whose peculiar formation of the jaws gives room to the enlarged tongue bone. This bone, communicating with the windpipe, and filled with air, enables them to utter those loud and frightful noises which are heard in the woods of Guyana, and are audible at more than a mile distant. Baron Humboldt says that nothing can exceed the effect which their mournful cries produce.

The Gluttonous Monkeys have received their name from their singular voracity, and come from the interior of North America.

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The second genus of *Quadrumanæ*, or the *Wistitis* (TABLE IV.), have only twenty grinders. All their nails are flattened and pointed, except those of the great toes, and their thumbs are scarcely opposable. In other respects they resemble the apes of the New World.

#### TABLE IV.

### ORDER II. QUADRUMANA.

GENUS II. ARCTOPITHECUS. *Wistiti, Hapale, Ouistitis.*

Subgenus 1. *WISTITI PROPER. Iacchus.* — Lower incisors pointed, placed in a curved line and equal to the canines; tail thick and raised; a tuft of hair on each ear.

2. *MIDAS.* Lower incisors cutting, placed almost in a straight line, and less than the canines; tail not raised.

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The Makis, which form the third genus of Apes (TABLE V.), vary in the number of their incisors; their thumbs and great toes are well developed and opposable, and the latter are armed with a rounded



and pointed nail, all the other nails being flat. Their grinders have vestiges of pointed tubercles, those of the upper and lower jaw fitting into each other.

Makis proper have small ears, and a pointed muzzle, which give them their English name. They are very agile, easily tamed, live on fruits, and come from the island of Madagascar. They make a shrill noise, occasionally varied by a grunt. They are never known to sleep at night, and are excessively greedy after fruit. They have the greatest dislike to children, but are affectionate to grown persons. One of them, called the Vari, is very fierce, and M. Frederic Cuvier says, that an individual of this species killed and devoured his companion, who was in the same cage as himself, and left nothing but the skin.

The black apes feed on insects, and occasionally small birds and quadrupeds. They walk very slowly, and are nocturnal animals. A curious account of a Lemur tardigradus (*fig. 6.*) is given by Mr. Baird, in a paper published in an early number of Mr. London's *Magazine of Natural History*. In addition to the annexed description of the animal, he says, that "his eyes shone in the dark, and that, instead of moving his eyelids up and down, he drew the skin diagonally over the eyes, and this without any peculiar formation to account for it. Beneath the usual tongue was another, white, narrow, and sharp-

pointed, which projected with the other tongue when he ate or drank, although he could retain it in his mouth when he pleased. He was fond of raw meat, but would not touch it when cooked, and especially preferred veal. He generally slept rolled up like a ball, but his arms over his head, grasping the bars of his cage. He was only active during the night, but at all times his motions were exceedingly slow and methodical, never moving his hind paws till he had secured a firm grasp with his hands. He was very timid, but when provoked uttered a plaintive cry, and bit sharply. A little dog lived with him for some time, and, except a slight quarrel now and then, they were always on good terms with each other. When this dog was taken away, a cat tried to become friends with him, to whose overtures, however, he did not pay the least attention."

The Galagos have a very singular gait, owing to the disproportion between their hind and fore legs. Their eyes are very large.

## TABLE V.

### ORDER II. QUADRUMANA.

#### GENUS III. MAKI. *Lemur*.

Subgenus 1. MAKI PROPER. *Lemur*, *Fox-headed Ape*. — Six incisors below, which are compressed and lean forward; straight, cutting canines; six molars on each side, above and below.

2. LICHANOTUS. *Indris*. — Four incisors above and below.

3. **TARDIGRADUS.** *Sloth Apes, Loris, Stenops, Singes paresseux.*—Grinders with sharper points than those of the Makis; muzzle short, like that of a mastiff; no tail; large eyes, placed near together; tongue rough.
4. **OTOLICNUS.** *Galago.*—Teeth like the preceding Tarsi long, causing great disproportion in their hind feet; long, tufted tail; wide membranaceous ears.
5. **TARSIVUS.** *Tarsiers.*—The space between the molars and incisors filled by several shorter teeth; the middle incisors of the upper jaw elongated, and resembling canines; muzzle short; eyes very large.



### ORDER III. CARNIVORA.

Quadrupeds with nails; three sorts of teeth; thumb of the fore feet not opposing.

THIS order is formed of a large and varied assemblage of animals, all of which live upon animal food, and the more exclusively so, as their grinders are more or less adapted for cutting or tearing. When their grinders are wholly, or partially, tuberculous, they also feed on vegetable substances, and those which possess grinders with conical points principally derive their nourishment from insects. Their brain is differently formed to that of man and Quadrumana, and the arched bones of the cheek into which the lower jaw is articulated (jointed), called the zygomatic arches, are placed high up in the skull, and project much, in

order to give room and strength to the powerful muscles which move the jaws. Their most acute sense is that of smell; and that membrane situated in the nose which receives the nerves destined to convey the sense of smell, called the pituitary\* membrane, instead of being folded, like that of man, is very complicated, and is extended over a great many bony plates. Almost all Carnivora can turn their fore arm (or what in common language would be called the lower part of the fore legs) to a certain degree, but not with the same facility as that enjoyed by the *Quadrumana*. Their intestines, owing to the digestible nature of their food, are not voluminous, and also to avoid that putrefaction which animal matter would undergo, if the canal through which it passes were to retain it for a lengthened period.

## TABLE VI.

## CLASS I. MAMMALIA.

## ORDER III. CARNIVORA.

## FAMILIES.

1. **CHEIROPTERA.**    *Bats, Chauve-souris.* — Teats placed upon the breast; a fold of skin beginning at the sides of the neck, extending between their feet and toes, and supporting them in the air; four large canines.
2. **INSECTIVORA.**    Grinders with conical points; feet short; teats situated under the belly; the entire sole of the foot placed on the ground when walking.

\* From *pituita*, the Latin for phlegm.

3. **CARNIVORA PROPER.** Two large and long canines, and six incisors in each jaw; grinders entirely formed for cutting, or partially possessing blunt tubercles.
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The variety of form and habits of the Carnivora necessitates their division into several families, the first of which is that of the Cheiroptera, which bear some affinity to the Quadrumana, especially that of the teats being placed upon the breast. Their great distinguishing character is that of a fold of skin, which commences at the side of the neck, and extends between their limbs, and toes or fingers, and enables them to support themselves in the air. Those whose fore feet or hands are longest, and consequently have the largest membrane, fly with the greatest rapidity. Their formation accords with this peculiar faculty, for they have very strong clavicles (collar bones) and scapulæ, (shoulder blades); but their power of turning the fore arm is necessarily weakened. All have four canine teeth, but the number of incisors varies. They are nocturnal or crepuscular (twilight) animals, and remain torpid during the winter, when they hang by their hind feet to the interior of hollow trees, the sides of caverns, roofs of barns, unfrequented houses, &c., and receive no injury from the foul air which they constantly breathe in the holes and recesses which they inhabit. They are divided into two great genera, Cheiroptera and Galeopithecus, the former of which have their fore arms and fingers so much elongated that the membrane which fills the intervening space

amounts to wings. With these they fly swiftly and to a considerable height, and are aided by the strong muscles of the breast, which are supported by a projecting ridge of bone, like that of birds. Their thumbs have a hooked nail, their hind feet are weak, and also furnished with hooked nails. Their eyes are small; but the ears of many are very large, and, together with the membrane between their legs, present so extended a surface to the air, that they are able to fly in all directions, even when deprived of sight. Some species have very singular developments of the skin of the head, in the shape of warts, folds, appendages to the ear and nose, like leaves, and opercula (lids) to each. They generally have two young ones at a birth, which often adhere to the teats of the mother as she flies from place to place, or are lodged in a sort of bag, formed by bending the tail and the membrane attached to it, under the body.

## TABLE VII.

### ORDER III. CARNIVORA.

#### FAMILY I. CHEIROPTERA.

##### GENUS I. VESPERTILIO. *Bats.*

Arms, fore-arms, and fingers or toes, excessively long; the membrane between these forming true wings; thumb short; armed with a hooked nail.

##### Tribe 1. HARPYIDÆ. *Frugivorous Bats.*

Subgenus 1. PTEROPUS. *Ghole, Rousset.* — Cutting incisors in each jaw; grinders with two furrows which

wear away with use ; membrane or wings deeply notched between the legs ; the first finger, half the length of the middle finger, has a third joint and a small nail.

Section 1. — Without tails ; four incisors in each jaw.

2. — With tails ; four incisors in each jaw.

Subgenus 2. **PACHYSOMA.** *Stout Gholes.*—Warts upon the lips.

3. **MACROGLOSSUS.** *Great-tongued Goblins.*—Long heads ; slender muzzles.

4. **HARPYIA.** *True Harpy, Tube-nosed Goblins.* — Thick muzzle ; large broad head ; nose elongated into two separate tubes.

5. **CEPHALOTES.** Wings meeting on the middle of the back ; no nail upon the first finger.

Tribe 2. **VESPERTILIONIDÆ.** *Insectivorous or True Bats.*

Division 1. *Two-jointed, leafless Bats.*

Subgenus 1. **MOLOSSUS.** *Dysopes, Bull-dog Bats.* — Wide, short ears, springing from the angle of the lips, and uniting over the muzzle ; a short, free leaf to the ear.

2. **CHEIROMELES.** Opposing great toe on the hind feet.

3. **STENODERMA.** *Narrow-banded Bats.* — Ears small, free, with an operculum ; membrane between the thighs, lining them like a band.

4. **DICILIDURUS.** *Box-tailed Bats.* — Broad ears meeting over the eyes ; bone of spine divided at the extremity, and forming a box.

5. **NOCTILIO.** *Hare-lipped Bats.* — Muzzle short, cleft like that of a hare, and set with warts and singular furrows ; ears with an internal operculum ; projecting nostrils.

6. **ÆLLO.** — Forehead flat ; large free ears ; tail having a membranous band.

7. **MYOPTERIS.** *Rat volant.*—Internal operculum to the ears; tail long, attached half way to the membrane.

Division 2. *Two-jointed, leaf-nosed Bats.*

Subgenus 1. **VAMPIRUS.** *Vampire.*—Long narrow head and muzzle; nose with two appendages, one horizontal in the form of a horse-shoe, the other erect like the blade of a javelin.

2. **PHYLLOSTOMA.** *Javelin Bats.*—Upright leaf on the end of the nose; a leaf to the ear, which is more or less dentated; tubercles on the lips.

Section 1. — Javelin bats, without tails.

2. — Javelin Bats, with tails adhering to the membrane.

3. — Javelin Bats with free tails, above the membrane.

Subgenus 3. **GLOSSOPHAGA.** Tongue very long; broad head; narrow muzzle; nose with two membranes.

Division 3. *One-jointed, leaf-nosed Bats.*

Subgenus 1. **MEGADERMA.** *Broad-winged Bats.*—Three leaves or appendages on the nose; leaf of the ear forked; large ears united over the head.

2. **RHINOLOPHUS.** *Horse-shoe Bats.*—Leaves of the nose very complicated, presenting the figure of a horse-shoe; four incisors below, two above.

Section 1.—A transversal, more or less circular, nose leaf.

2. — A complicated nose leaf.

Subgenus 3. **NYCTOPHILUS.** *South-Sea Bats.*—Leaf to the ear like a spear; other appendages less; upper incisors like canines.

4. **NYCTERIS.** *Cheek-pouched Bats.*—Tail forked at the tip; membrane between the thighs longer and wider than the body; forehead with a deep furrow.



- 5 **DESMODUS.** *Curved-tooth Bats.* — Muzzle obtuse ; opercula to ears ; complicated membranes to the nose ; no tail.
6. **RHINOPOMA.** *Lid-nosed Bats.* — Long noses, and nostrils covered with a lid or scale.
7. **TAPHOZOUS.** *Wing-pouched Bats, Taphiens.* — Membrane near the fore legs elongated, so as to form a pouch near the wrist.
8. **MOERMOOPS.** *Mormoop Bats.* — Erect leaf of the nose adhering to the large ears.

Division 4. *One-jointed, leafless Bats.*

- Subgenus 1. **EMBALLONURA.** *Long-nosed Bats.* — Long muzzle ; upper jaw the longest. Conical head.
2. **UROCRYPTUS.** *Concealed-tailed Bats.*
  3. **MYCTICEJUS.** *Roquet-dog Bats.* — From thirty-two to thirty-four teeth ; long tail piercing through the membrane.

Section 1. — Close, smooth fur, or partially naked.

2. — Fur long ; interfemoral membrane clad with hair.

Subgenus 4. **VESPERTILIO.** *Bats Proper.* — Nose and ears without leaves ; the latter free ; four incisors above, six below and dentated. Tail connected with the membrane.

- 5 **PLECOTUS.** *Large-eared Bats.* — Ears bigger than the head, joined upon the skull ; leaves of the ear large, and like a lance ; an operculum over the orifice of the ear.

**GENUS II. GALEOPTHECUS.** *Flying Bats, Chats volants.*

Fingers with sharp nails, and not longer than the toes ; membrane not large enough for flying ; canines dentated and short ; upper incisors twelve, dentated, wide apart from each other ; six below, divided like the teeth of a comb.

The incisors of the Gholes are very sharp, and the flat, worn crowns to their grinders show that they chiefly live on fruit. They, however, occasionally eat birds, small quadrupeds and reptiles. They are the largest of all bats, some of them measuring five feet from the tip of one wing to that of the other, and come from the East Indies, where the natives catch them by means of a net fastened to a pole, and eat them: Europeans, however, find them very disagreeable on account of their musky smell. The membrane between the hind legs, called the interfemoral\*, is very small. The cry of the *Pteropus edulis*, or Edible Ghole, resembles that of a goose. Those without tails are said to have given rise to the ancient fable of the Harpies. M. Geoffroy found the *Pteropus ægyptiacus* in the pyramids of Egypt; and it has since been discovered in Senegal. Mr. Gray mentions a species (of which he makes a genus) that has a gland on each side of its neck, emitting a strong odour, but the use of which no one has ascertained. Among the Great-tongued Goblins is the Lowo Apu, or Dog-Bat of Java, well known for devouring the Jamba (*Eugenia Jambos*) or Rose apple, which is much cultivated for its extreme beauty and delicious odour, in the gardens of that country.

The grinders of the Insectivorous Bats always have conical points; the first toe of the fore feet, or the index, has only one or two joints, and is destitute of a nail. With the single exception of the *Stenodermæ*, the membrane is always complete between the

\* From *inter*, between, and *femur*, a thigh.

thighs. This tribe is spread over all the tropical and temperate zones of the earth, and is grouped into four divisions. The index of the first has two bony joints; and the nose is destitute of appendages.

The Box-tailed Bats have a very curious formation, inasmuch as the bones forming the extremity of the spine, and called the coccygeal, project "into two jointed, horny pieces, and are so covered by the skin of the body as to form a box of two valves, applied horizontally, and capable of separate motion. They were found by Mr. Freyreise upon cocoa trees, near the Rio Pardo in Brazil."\*

The second division has the two-jointed index with leaves upon the nose. In it we find the most extravagant developements of the skin of the head, the wings, and the ears. It possesses an internal conch to the ear†, which is remarkably sensitive, and, with the tubular nostrils, closes at will.

The Vampires form the most remarkable subgenus in this assemblage of strange forms; they have notched leaves to the ears, a tongue capable of great extension, and provided with small papillæ‡, which assist in the action of sucking. They have been accused of extracting blood from human beings so as to deprive them of life; but, although great blood-

\* For this and several other descriptions, I am indebted to Colonel Hamilton Smith's able work on Mammalia, which forms a part of the *Naturalist's Library*.

† The conch is that cartilaginous substance which surrounds the orifice of the ear.

‡ Papillæ are protuberances, like the small red spots on the human tongue.

suckers, it is probable that the wounds which they make become envenomed (which is often the case in hot climates), and so cause the death of the sufferers. They do not attack large animals, and man only when he sleeps; they then invariably fix upon the great toe, and make a wound, which bleeds freely after the Vampire (*fig. 7.*) has left it. Mr. Waterton killed a

species called the Spectre, which measured thirty-two inches across the wings, and which was not only a sucker of blood, but fed on fruit and insects. It inhabited thick woods.

Javelin Bats are only found in America, and run on the ground with ease, a faculty not possessed by other bats.

The third division has one joint to the index. Its

first sub-genus, *Megaderma*, has one of its nose appendages upright, a second horizontal, and the third like a horse-shoe. The nose membranes of the *Rhinolophi* are the most complicated of all. The species named *Unihastatus* inhabits quarries, where it hangs by the feet, with its wings closely wrapped over its body. It resists cold temperatures so well, that it is only torpid for a few days during the winter.

The sub-genus *Nycteris* frequents dark and nauseous caverns, and has "the power of inflating the tissues of the skin by means of two passages communicating with the mouth, thereby rendering itself, like birds, specifically lighter." \*

The *Desmodi* are comparatively small, but blood-suckers; and one was caught in the act of bleeding a horse.

The fourth division has only one bony joint to the index, and no appendages to the nose.

The *Vespertiliones* have "odoriferous glands" about the head. They, the *Rhinolophi*, and perhaps all the long-tailed Bats, use their tail as a finger, and with it convey their food into their mouths or throats. The *Vespertiliones* are more widely spread over the globe than any other bats, New Holland being the only portion of the earth which forms an exception. Those of Europe congregate in numbers previous to hibernation †, and then "link themselves together in masses," in the places where they remain torpid.

\* Colonel Hamilton Smith. Vide *supra*.

† Passing the winter in a state of lethargy.

Little can be said of Bats beyond those characters which are desirable to the naturalist; for the marvellous and superstitious stories related of these animals, probably in consequence of their strange and often disgusting appearance, their piercing bite, and their abode in dark and dirty localities, have all been contradicted by a better knowledge of their habits.

The Galeopithecii are placed among the Bats by Cuvier, but other authors are inclined to put them between the Quadrumana and Cheiroptera. They live upon trees in the islands of the Indian Archipelago; and although they prey upon insects, and probably small birds, they also eat fruit.

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## FAMILY II. INSECTIVORA.

These animals are either nocturnal or subterranean in their habits; they feed principally on insects, and in cold countries, and many of them pass the winter in a state of torpor. Although they have not wings to support them like Bats, they are, nevertheless, provided with collar-bones. Their movements are feeble; the position and relative proportion of their incisors and canines vary much, some having long incisors in front, followed by others, and by canines, which are shorter than the grinders, as in the Tarsii, among the Quadrumana, while others have large canines, and small incisors between them; and these two modes of dentition are to be met with in those

which resemble each other in form and mode of life. They are now divided into two tribes,—the first of which has the fore legs and feet formed for mere walking or swimming; and in the second these extremities are adapted to digging and burrowing under ground.

## TABLE VIII.

## ORDER III. CARNIVORA.

## FAMILY II. INSECTIVORA.

- Tribe 1. **INSECTIVORA PROPER.**—Grinders having conical points; feet short; teats on the belly.
- Tribe 2. **TALPIDÆ, or Moles.**—Grinders as above; fore-legs very short, with very wide feet furnished with long, flat, and sharp nails.

## Tribe 1.

- Genus 1. **ERINACEUS.** *Hedgehogs, Hérissons.*—The body covered with prickles; tail short; five toes on all the feet; six incisors above and below, the middle of which are the longest; three false grinders; three grinders with points, and a small grinder with tubercles on each side.
2. **GYMNURA.** *Oriental Hedgehogs.*—A long tail without prickles; snout very long; and ears round.
3. **CENTENES.** *Tenrec, Tanrec, Tendirac, Madagascar Hedgehogs.*—No tail; muzzle very pointed; from four to six incisors, and two large canines in each jaw; one or two small teeth; and four triangular grinders, with points behind.
4. **CLADOBATES.** *Tupaia.*—Upper and middle incisors less long than those of the Hedgehogs; four long ones in the lower jaw; no tuberculous tooth behind; body covered with hair; a long bushy tail.

- Genus 5. SOREX.** *Shrews, Musaraignes.*—Body covered with hair; on each flank a small band of stiff, closely-set bristles, from between which issues a foetid smell; two upper and middle incisors, crook'd and dentated at the base; the lower incisors obliquely set, and long; five small teeth follow the upper incisors, and only two the lower; three grinders, with points in each jaw; and a small tuberculous tooth behind the rest, in the upper jaw.
6. **MACROCELIDES.** *Long-snouted Shrews.*—No tail; and snout very long.
7. **SOLENOTODON.**—Not yet distinctly described.
8. **MYGALE.** *Desman.*—Two very small teeth placed between the two large lower incisors; two upper incisors, triangular and flattened; six or seven small teeth, and four grinders, with points, behind these incisors; muzzle prolonged into a small trunk, which is very flexible, and moves incessantly; tail long, scaly, and flattened at the sides; feet with five toes, all united by membranes.

## Tribe 2.

- Genus 1. CHRYSOCHLORIS.** *Shining Mole, Chrysochlores.*—Two incisors above, and four below; grinders long, distinct, and almost all like triangular prisms; muzzle short, wide, and turned up; only three nails on the fore-feet, the outer one very thick, arched, and pointed.
2. **TALPA.** *Moles proper, Taupes.*—Toes of the fore-feet scarcely to be distinguished; nails long, strong, flat, and sharp; head elongated, and pointed; six incisors above, eight below; canines with two roots; four false grinders above, three below, followed by three grinders with joints.
3. **CONDYLURA.** *Radiated Moles.*—Two wide, trian-



gular incisors in the upper jaw, followed by two which are very small and thin, and a strong canine on each side; four incisors below, leaning forwards, and a small pointed canine; the upper false grinders triangular, and wide apart, and the lower sharp and dentated.

Genus 4. SCALOPS. *Shrew-Moles*. — Teeth like those of the Desman, but the false grinders less numerous; wide fore-feet armed with strong nails.

The skin on the back of Hedgehogs is moved by a peculiar set of muscles, so as to enable these animals to bend their head and paws towards the belly, and roll themselves into a ball, which on all sides presents a complete surface of prickles when they are attacked by an enemy. Pallas, the Russian naturalist, was the first to remark that Hedgehogs could eat cantharides\* with impunity, which, when swallowed by other animals, cause dreadful torments; and since his time several observers have stated that this animal is insensible to poison of any kind. It has been seen to fight with adders, and to be bitten by them about the lips and nose, and yet receive no injury from them; and prussic acid has been administered to them without producing the slightest effect. They are easily tamed, and are very useful from devouring the beetles which infest kitchens, bake-houses, &c. They pass the winter in holes, and eat fruit and eggs as well as insects.

The Tenrecs have the same prickles as the Hedgehogs, but have not the power of rolling themselves into a ball. They live in the torrid zone of the

\* The beetles used in medicine for raising blisters.

Old World, where Bruguere says they sleep for three months, during the greatest heat.

The Tupaias, made known by Sir Stamford Raffles and Dr. Horsfield, come from the Indian Archipelago. They climb trees with the agility of squirrels, for which they might be easily mistaken were it not for their long sharp snouts.

Shrews are in general small; and the common species live in holes during the summer, and under hay-stacks in winter. Cats will kill, but rarely eat them; if they do, they immediately reject them from the stomach. The Water Shrew is often seen in ditches and ponds, and utters a shrill cry. It perforates the neighbouring banks with holes, in which it lives, and has the power of closing its ears when it dives. It was one of the animals embalmed by the Egyptians.

The webbed feet of the Desmans enable them to swim; their eyes are very small, and they have no external ears. Those of Russia are almost as large as a hedgehog, and eat insects and leeches, which they drag from the mud with their trunks. The mouths of the holes in which they live are always under water, but, as they burrow upwards, the spot which they actually inhabit is dry. Some small glands\* under the tail send forth so strong an odour

\* A gland is a vessel of the body, which has the power of sucking up, or separating, and retaining a certain portion of the juices which pass through the body; for instance, the glands which are here mentioned absorb that portion which causes the odour of musk, and leave the rest to proceed to other parts. These absorptions are also called secretions.

of musk, that the flesh of the pike, who eat them, is strongly impregnated with it.

The large and pointed outer nail of the Chrysochlores enables them to dig with facility: they are subterranean animals; and their fore-arm is supported by three bones instead of two. The Chrysochloris of the Cape is the only animal which presents that metallic lustre displayed by birds, fishes, and insects; it is green, changing to copper-colour and bronze. Its ears are not external, and its eyes are not perceptible.

The form of Moles proper is admirably adapted to their subterranean life; their very short fore-legs are attached to a long shoulder-blade, and supported by a long collar-bone, and they end in a wide paw, sharp at its lower edge. With these, and its nails, the mole burrows its way under ground, and pushes the earth behind it. Its breast-bone is like that of a bird, in order to support the powerful muscles of its breast. Its hinder parts are weak, and it moves with difficulty on the surface of the ground. Its hearing is very acute; and its eyes are so small, and hidden by hair, that their existence was long doubted. Its snout is furnished with a bone at the end, the better to enable it to pierce the earth; and the muscles of its neck are very strong. They are, generally speaking, peaceable animals, but eat one another in confinement. Sir Thomas Brown asserts, that when shut up in a glass case with a viper and a toad, a mole killed them both, and partially devoured them; although Mr. Jesse says, that they eat frogs,

but never toads. They are said to feed sometimes on the roots of the colchicum\*, which has so powerful an effect on human beings. M. Le Court calculates that they run as fast as a swift horse will trot. They burrow very quickly, even where the ground is dry and hard; their smell is equal to their hearing; and when the males fight, if they receive the smallest wound in a vein which lies behind the ear they instantly die,—which has given rise to the assertion that the least drop of blood taken from a mole causes immediate death.

The Condyluræ are called Radiated Moles, because their nostrils are surrounded by twenty-two small, moveable, cartilaginous points, which represent a sort of star when expanded. Their external form resembles that of the mole, but their tail is longer.

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### FAMILY III. CARNIVORA PROPER.

Four thick and long canine teeth, six incisors between each.

Although the term Carnivora is applied to all those animals which have nails, three sorts of teeth, and feed on flesh, and which are not Quadrumana, there are some among them which, as we have seen in the foregoing families, are forced by their feebleness, and the conical tubercles of their grinders, to confine themselves chiefly to insects. We have now to consider those in whom the appetite for blood is deve-

\* Meadow saffron.

loped in full force, and which form the third and last family of Carnivora. Their first grinders are the sharpest, then comes one larger than the rest, which generally has a tuberculous heel to it, and behind this are one or two flat teeth. These large grinders are called the carnivorous teeth, those which precede them the false grinders, and the last tuberculous teeth. Those Carnivora which have the fewest tubercles live most exclusively on animal food. The genera are arranged according to the above dentition, but there are yet other divisions formed upon the position assumed by the hind-foot. Instead of planting the entire sole upon the ground when walking, as in the two preceding families, some of them walk upon their toes only, and raise the heel, a peculiarity which may be easily detected by inspecting the foot, for the portion thus raised is always covered with hair. These are more rapid in their movements than the others, and their habits and internal formation are in accordance. Others have the feet so short, and buried in the skin, that they can only crawl upon the ground; but as the spaces between the toes are filled up by membranes, they swim well, and pass the greater part of their lives in the sea, only coming ashore to suckle their young or bask in the sun.

We here give a table of the divisions of Carnivora Proper, according to the system adopted by Baron Cuvier. Other naturalists greatly subdivide the tribes, and in so doing, perhaps, become too complicated for the general reader.

## TABLE IX.

## ORDER III. CARNIVORA.

## FAMILY III. CARNIVORA PROPER.

- Tribe 1. **PLANTIGRADA.**—The whole of the foot touching the ground when walking.
- Tribe 2. **DIGITIGRADA.**—The heel raised, and only the toes used when walking.
- Tribe 3. **AMPHIBIA.**—Feet short, and enveloped in skin; intervals between the toes filled up by membranes.

Tribe 1. **PLANTIGRADA.**

- Genus 1. **URSUS.** *Bears, Ours.*—Three large grinders above and below, and on each side (or everywhere) wholly tuberculous; the first and last of which, in the upper jaw, are the largest; these are preceded by a carnivorous tooth, and a varying number of false grinders.
2. **PROCYON.** *Raccoons, Ratons.*—Three back, tuberculous grinders everywhere, the uppermost of which are square; three pointed false grinders before them, forming a continued series to the canines, which are straight and compressed; tail long.
3. **AILURUS.** *Panda.*—Canines of the Raccoons, one false grinder every where; the rest of the teeth not well known.
4. **ICTIDES.** *Arctitis, Benturongs.*—Teeth like those of the Raccoon, except that the three back grinders are much smaller and less tuberculous.
5. **NASUA.** *Coatis.*—Teeth and tail of the Raccoon; nose singularly long and flexible; feet semi-palmate.

- Genus 6. **CERCOLEPTES.** *Kinkajous, Potto.* — Two pointed grinders in front, and three with tubercles behind : a long tail, and short muzzle.
7. **MELES.** *Badgers, Blaireaux.* — One very small tooth behind each canine ; then two pointed grinders, followed above by one which approaches a carnivorous tooth ; behind this, a square, tuberculous tooth, larger than the rest ; the last but one below has some resemblance to a carnivorous tooth, but it has two tubercles on its internal edge ; the last grinder is very small.
8. **GULO.** *Gluttons, Wolverines, Gloutons.* — Three false grinders above, and four below, preceding the carnivorous tooth ; behind the latter, a small tuberculous tooth, which in the upper jaw is wider than long ; the upper carnivorous tooth has a tubercle inside.
- Sub-genus 1. **HUONS.** — One false grinder less in each jaw, and a long tail.
2. **MELLIVORA.** *Ratellus, Ratels.* — One false grinder less ; the upper tuberculous tooth but little developed.

Bears, in consequence of placing the whole of their feet upon the ground, are able to stand upon their hind-legs with great ease. They are slow in their walk, are nocturnal animals ; and most of those which inhabit cold countries pass the winter in a state of lethargy. Their dentition is almost frugivorous ;\* and they only eat flesh when driven to it by necessity. The cartilage of their nose is prolonged and moveable ; they vary much in colour, from white and fawn, to brown and black. They possess great strength,

\* Fruit-eating.

especially in their fore-paws, with which they suffocate their enemies when attacked. They inhabit most parts of the world, accommodating themselves as well to the torrid as to the frigid zone, and hollow out caves, or form rude huts, to live in, and in which to bring forth their young. Both their skins and their flesh are useful to man: they are extremely sagacious; climb trees with facility, carry enormous weights, and are everywhere objects of superstitious fear and reverence. The expression of their countenances is often malignant; and when the nictitating membrane\* half covers the eye, their aspect is particularly ferocious: they, however, occasionally evince much attachment, and seldom make the first attack. They utter a variety of hideous sounds, some of which may be compared to the ravings of a drunken man; others are nasal, and their growls are loud and deep.

The various species of this genus afford so much interesting matter, that it becomes difficult to make any selection from the mass; and to relate all would

\* This is a third eyelid, proceeding from the inner angle of the eye.



require a thick volume devoted to no other purpose. The present pages, therefore, will in this instance, as well as most others, only contain those anecdotes which have come within the notice of the author or her friends. A proof of the docility of the bear was received by a military officer, who, being stationed with a small detachment at a lone and distant fortress in Canada, amused himself by taming a young bear. The animal soon learned to follow his master like a dog, to carry things for him, and at meal-times waited for his share with the utmost patience. When the officer returned to Europe he brought the bear with him, which soon became a great favourite with every one on board, and delighted in romping from one end of the vessel to the other. The principal object of his attachment, however, was a little girl about three or four years old, the child of one of the passengers. In a sportive mood he one day seized her with one forepaw, and, assisting himself with the other, carried her into the main-top, where he tried to play with her, regardless of her cries, or the agony of the mother who witnessed the act. To pursue them would probably have brought destruction on the child ; and the master, recollecting that his pet was very fond of sugar, had a quantity strewed on the deck, having first taken the precaution of placing mattresses all round the main-mast in case the child should fall : he called him, and pointed to the sugar, when, after a few moments pause, the bear descended, and happily brought the child down in safety : he was of course deprived of liberty during the rest of his voyage.

The bears of the Menagerie in Paris were well known to those who visited that capital some years back, where they were kept in deep, but open pits, and where they used to play all sorts of spontaneous antics in order to obtain cakes, &c. Generally every three years the magnificent alleys of lime-trees in that garden were visited by numbers of cockchafers, which used to lie in heaps on the ground beneath. It was a favourite amusement with the author to collect these insects, and, putting them into little funnels of paper, throw them to the bears, who received them with great delight, and knew her directly she appeared by the rampart wall of the pit. A tragical event at that time caused the removal of the bears from this spot to close dens; for a soldier having one day seen what he thought to be a five franc piece in their abode, determined, when he was on duty about 4 o'clock the next morning, to secure it for himself, and announced his intention to his comrades, who endeavoured to dissuade him from his purpose. He provided himself with a ladder, and when the guard was changed some hours after, he was seen lying dead at the bottom of the pit, and the ladder leaning against the wall. No marks of violence were found about his body, so that the bears could not have suffocated him, but the contusions on his head led to the supposition that he had fallen, and been so killed; the five franc piece proved to be a large button. The circumstance was much talked of, and numbers flocked to the side of the pit, to see the murderous bears, for so the multitude believed them

to be; and nursemaids frequently held children over the wall, either to enable them to see also, or allow of their own leaning forward in order to obtain a better view. A gentleman who happened to be passing on one of these occasions expostulated on the danger of the proceeding, and told one of the young women that her charge ran the risk of being killed: in a very few hours this was magnified into the actual death of a child, and by the evening it was reported in Paris that it had been devoured, and that the nurse, in a fit of despair, had thrown herself into the Seine. The public were greatly excited at this, and loudly demanded the destruction of the bears, not excepting, their old favourite, Martin; but the directors of the garden, thinking that the excitement would soon subside, paid no attention to the clamour. However, two balls of poisonous matter having been found in the pit some time after, it was deemed advisable to remove the bears for their own sake, but very much to their discomfort, into the houses of the menagerie.

A gentleman residing in Canada had an awkward rencounter with a brown bear of that country, which sprang upon him as he was walking in a plantation: he was, fortunately, seized in such a manner as to enable him to clasp his arms round the bear, and, being a large and powerful man, he hugged the bear in his turn. The animal was so much surprised at the resistance which he met with, that he loosened his hold and made his escape: the gentleman returned to his house in a very exhausted condition, with his clothes much torn, and was ill for some days in consequence

of the embrace which he had received. Many of the northern bears measure from eight to nine feet.

Raccoons look very much like miniature bears. They are easily tamed, but are always irritable, and bite sharply. They have a curious habit of plunging into water that which they are about to eat.

Badgers have short tails, toes very much covered by skin, and a pouch (or pocket) under the tail, whence issues a strong and fetid odour. The nails of the fore feet are very powerful, and fit for digging; their body is thick, and their legs are short. They are



mostly of a brownish-grey colour, and have a black band on each side of the head; but red varieties have been found.

They are easily tamed when young, fight obstinately, are difficult to kill, and sportsmen find great pleasure in hunting them.

The voracity of Gluttons has been greatly exaggerated, but they are supposed, with more reason, to be very cruel. They are said to overcome large animals by leaping upon their necks from the trees under which the latter pass. Colonel Hamilton Smith says, "Hunters in both hemispheres agree that, preying on the northern stags, and on rein-deer of the woods, they can only obtain this quarry by carrying in the mouth a quantity of lichen, with which they ascend a tree, crawl on a protruded limb; and drop it, while they lie close and motionless: thus they wait patiently till a deer passes, which, stooping to smell at

the bait, uncovers its neck from the protection of the horns, and affords time for the Gluttons to drop down upon its shoulders, where, fixing their long and formidable claws, the canine teeth are directed at the great blood-vessels of the neck, and there the remorseless brute hangs, regardless of blows from the horns, or of being dashed against trees; and, if no deep water is at hand, he never quits hold, nor fails of destroying his prey in a few minutes. They have an acute sense of smelling, detecting buried food at great depths, and labouring with prodigious energy and skill to dig it up, often to the great distress of hunters, who vainly conceal their provisions in what they call *cachés*, well fenced with stones, from their depredations."

## TABLE X.

## ORDER III. CARNIVORA.

## FAMILY III. CARNIVORA PROPER.

## Tribe 2. DIGITIGRADA.

- Division 1. Only one tuberculous tooth behind the upper canines.
- Division 2. Two flat tuberculous teeth behind the upper canines.
- Division 3. No small teeth behind the large lower grinders.

## Division 1.

GENUS. MUSTELA. *Martes*.

- Subgenus 1. PUTORIUS. *Pole-cat, Foumart, Fitchet, Ferret, Putois*. — Lower carnivorous tooth has no tu-

bercle inside; upper tuberculous tooth wider than it is long; two false grinders above, and three below.

2. **MUSTELA PROPER.** *Martin, Weasel, Martes.* — One false grinder more above and below than the Pole-cats; a small tubercle inside their lower carnivorous tooth.
3. **MEPHITIS.** *Skunk, Mouffettes.* — False grinders like those of the Pole-cats; upper tuberculous tooth as long as wide, and their lower carnivorous tooth has two tubercles within; nails, on the fore feet, very long.
4. **MIDAUS.** — Teeth, feet, and colours of the Skunk, but the muzzle truncated; and tail consisting of a few hairs.
5. **LUTRA.** *Otter, Loutres.* — Three false grinders above and below; a strong heel to the upper carnivorous tooth; and tuberculous tooth very large; head flattened.

#### Division 2.

**GENUS I. CANIS.** *Lupus, Dog, Wolf, Chiens, Loups.*

- Subgenus 1. DOGS PROPER.** — Three false grinders above, four below; two tuberculous teeth behind the carnivorous teeth, the first of which is very large; upper carnivorous tooth has one small tubercle within, but all of the back part of the lower, tuberculous; five toes on the fore feet, four on the hind feet; tongue smooth.
2. **VULPES.** *Foxes, Renards.* — Upper incisors less sloped than those of dogs; muzzle pointed; tufted tail.
  3. **MEGALOTIS.** *Fennec, Zerda.* — Large ears; strong hairs in the moustaches.
  4. **HYÆNA VENATICA.** — Four toes on each foot; teeth like those of the dog.

GENUS II. VIVERRA. *Civettes*.

Three false grinders above, four below; two tuberculous teeth above, one below; two projecting tubercles on the inner side of the carnivorous tooth, and the rest of the tooth more or less tuberculous; nails turn up when walking.

- Subgenus 1. **VIVERRA PROPER.** *Civets*. — A deep pocket near the tail, divided into two bags, and filled with a greasy substance, having a strong smell of musk.
2. **GENETTA.** *Genets. Genettes*. — Pocket reduced to a slight depression, but sending forth a strong smell; nails retractile.
  3. **PARADOXURUS.** — Thick body; feet semi-palmate; tail spiral, but not prehensile.
  4. **HERPESTES.** *Ichneumon, Mangoustes*. — A voluminous pocket under the tail; hairs tinged with dark and light shades of colour.
  5. **RYZÆNA.** *Surecats, Suricates*. — Fur like the Ichneumons; four toes on each foot; they have a sour smell.
  6. **CROSSARCHUS.** *Meercats, Mangles*. — Muzzle, teeth, pocket, and walk of the Surecats, but toes of the Ichneumons.
  7. **PROTELES.** — Five toes before, four behind; head elongated; hind feet shorter than the fore feet; great toe of the fore feet short; mane like a Hyæna.

The Tribe Digitigrada has three divisions, as may be seen in Table X., the first of which has one great genus, and all the animals which compose it are called Vermiform,\* on account of the length of their body and the shortness of their legs,—a shape which enables

\* Worm-like.

them to pass through the smallest apertures. They yield our most valuable furs; are, generally speaking, extremely savage, and prefer blood to any other nourishment. The Pole-cats are, perhaps, the most sanguinary of all, have a strong, disagreeable odour, and vary in colour. The domestic Ferret is only a white variety of that which is pale yellow, sprinkled with long black hairs. They have a shorter muzzle than that of Martina. Among the latter is the *Mustela erminea*, which affords the ermine of furriers. It is entirely white during the winter, except the tail, which is tipped with black. It is an inhabitant of frozen regions, but is sometimes found further south. The Minck also belongs to this subgenus; the fur of which is much used, and is found from the Frozen Ocean to the Black Sea. It feeds on frogs, crabs, and fish. The animal commonly called Weasel in England is also placed in this subgenus, and is a bold little creature, which does not scruple to attack animals much larger than itself, seizing them by the throat, and not leaving them till they fall from exhaustion. The following curious story is told of one in Scotland: "An eagle was seen by some hay-makers rising in the air with a peculiar flight; he flapped his wings with violence, as if much alarmed and agitated, and rapidly ascended; in a short time, however, he descended with still greater rapidity, tumbling down like a shot bird. When he reached



the earth, the party observing him ran to ascertain the cause of this occurrence, when a large weasel ran from the body, stood upon its hind legs for a few moments to survey its enemies, crossed its fore paws over its nose, and then went into a neighbouring bush. On examining the eagle it was dead, having been killed by a wound in its throat, supposed to have been made by the weasel. This supposition was confirmed by a similar attack having been made by a weasel upon a grouse, which flew away with the animal hanging to it."

Skunks resemble badgers in having long front nails for digging, in being less digitigrade than other animals of the genus, and being much of the same colour. The whole of the genus *Mustela* is remarkable for its disagreeable odour, but Skunks exceed all others in this respect. They are generally black, striped with white: that of North America smells like garlic, and sends forth a fluid which will taint everything which it has touched; and clothes will retain the smell for months, however frequently they may have been washed during that period.

The tail of Otters is horizontally compressed; they have webbed feet, and are aquatic in their habits. They feed principally on fishes, but occasionally eat snails, worms, &c., and live in holes, or weedy banks under the roots of

trees, &c. Colonel Hamilton Smith has seen them swim the distance of more than a mile to sea; and one species is named the Sea Otter, and lives in salt water. Its fur is as soft as velvet, and it is much sought for in the northern parts of the Pacific Ocean for its skin. It is twice as large as the common otter. Otters bear a very bad character with sportsmen in Europe, as they destroy fish; but the Indians train them to catch fish for their masters, and find them very useful and sagacious.

The courage of the animals composing the second division of Digitigrada does not equal their strength: they are all entirely carnivorous, with the exception of some individual instances, and those who have partaken of the civilisation of man.

The first genus is that of the Dog, the most numerous and important of all, the greatest friend of man, as well as one of his greatest enemies. Its second subgenus yields him one of his most pleasurable sports.

The Dog is remarkable for his curved tail; but it is impossible to enumerate the infinite varieties of his size, colour, and form. To use Baron Cuvier's own words: "This is the most complete, the most extraordinary, and the most useful conquest ever achieved by man; every species has become his own; each individual belongs entirely to his master, forms himself according to his habits, knows and defends his property, remains attached to him until" (and even after) "his death; and all this proceeds neither from necessity nor constraint, but solely from gratitude and real

friendship. The speed, strength, and smell of the dog have made him the powerful ally of man against other animals, and, perhaps, a necessary element in the establishment of society, and it is the only animal which has followed him throughout the globe. Some naturalists think that the original dog was a wolf, others that he was a jackal; but the dogs which become wild in desert islands do not resemble either the one or the other. Wild dogs, and those of people who are but little civilised, such as the inhabitants of New Holland, have upright ears, which have caused the opinion that the European races nearest to the original form are the Shepherd's and the Wolf Dog; but a comparison between the skulls shows a greater resemblance between the wild dog and the Mastiff and Danish Dog: after which come the Hound, the Setter, and the Terrier, which only differ in size, and the proportion of the limbs. The Greyhound is more slender, and his smell weaker than others of his race. The Shepherd's and Wolf Dog, although they have the upright ears of the wild dog, possess more brain than the latter,—an organisation which increases still more in those species which evince the most intelligence, such as the Poodle, the Spaniel, &c."

All of the Genus *Canis* are born with their eyes shut, and do not open them till the tenth or twelfth day; their teeth begin to change when they are four months old, and they have generally attained their full stature at the end of two years. The females have from six to twelve puppies at a birth. All dogs

are old at fifteen, and rarely reach the age of twenty years.

The countless histories told of dogs all prove the high degree of intelligence and strength of attachment which they possess, and many interesting volumes have been written on this one subject. Two of the three following anecdotes have never been published; all have come under the immediate observation of the author or her friends, and forcibly illustrate the reasoning powers of these animals. A countryman was charged with a letter, which he delivered while the gentleman for whom it was designed was at breakfast; he was shown into a parlour, where he was about to sit down, when a growl saluted his ears: turning round, he saw a spaniel lying in a chair near the fireplace, who reared her head, and, the end of the bell-pull having a ring attached to it, placed her paw within it; as often as he attempted to sit, so often did she growl; his curiosity became excited, and he at length seated himself in a chair, when the animal gave a strong pull, and the bell rang. A servant answered the summons, and was much astonished when he heard who had rung the bell, but was equally pleased, for it explained a mystery which had long remained unsolved, and had made him and his fellow-servants very uncomfortable. Whenever any of them sat up for their master and mistress, the parlour bell was sure to ring almost immediately after they had settled themselves to sleep, and of course they could not have suspected the spaniel, although they afterwards recollected that

when they awoke she was not to be seen, although she had been sitting by their side a few minutes before. There was no doubt that directly she saw their eyes closed, she went to the bell to rouse them to watchfulness.

Two Poodle dogs from Milan, the elder named Fido and the other called Bianco, were shown in Paris for their remarkable powers. Fido was a grave and serious dog, who walked with much solemnity round the circle assembled to see him, but Bianco was younger, and somewhat giddy. A word was given to Fido from the Greek, Latin, Italian, French, or English languages, and selected from a book where fifty words in each tongue were inscribed, which altogether made three hundred combinations. He selected from the letters of the alphabet those which composed the given word, and laid them in order at the feet of his master. On one occasion the word heaven was told him, and he quickly placed the letters till he came to the second *e*, when, after vainly searching for the letter in his alphabet, he took it from the first syllable, and inserted it in the second. He went through the four first rules of arithmetic in the same way with extraordinary celerity, and arranged the double cyphers in the same way as the double vowel in heaven. Bianco, however, although so giddy, was quicker than Fido, and when the latter made a mistake, was called in to rectify it, but as quickly dismissed, as he was wont to pull his companion's ears, to come and play with him. One day Fido spelt the word Jupiter with a *b*, but the

younger savant being summoned to correct the error, he carefully contemplated the word, and, pushing out the *b*, replaced it with a *p*. A lady held her repeating watch to the ear of Fido, and made it strike eight hours and three quarters; Fido immediately selected an 8, and then a 6 for the three quarters: the company present, and the master, insisted upon his error, and he again looked among his cyphers, but, being unable to rectify it, he coolly sat himself down in the middle, and looked at the spectators; the watch was again sounded, and it was ascertained that it struck two for every quarter, which quite exonerated Fido. Both dogs would sit down to *écarté*, asking each other for, or refusing, cards, with the most important and significant look, cutting at proper times, and never mistaking one card for another. Bianco occasionally won, and went to the cyphers to mark his points, and when he was asked how many his adversary had gained, he took out an 0 with his teeth. They sometimes played at *écarté* with one of the company, when they evinced the same correctness, and seemed to know all the turns of the game. All this passed without the slightest audible or visible sign between them and their master, although there must of course have been some established mode of communication, and their memory strongly exercised.

A Scotch terrier who had been the favourite of a lady for some years, and during that time had evinced great sagacity and attachment, even appearing to comprehend parts of the conversation passing in his presence, was accustomed to sleep upon her bed, and

never to leave her except when one of her family took him to walk. Her last illness was of three months duration, during which time he was generally on the bed, night and day. For the space of a month his mistress's death was daily expected, and the dog was always sad and dull, which was attributed to the change in the habits and feelings of the family. Two days before the lady expired, the dog left her bed, and hid himself under it in a corner which had always been his place of refuge when unhappy or alarmed. He could with difficulty be prevailed on to quit it when sought for; and even when he was held up to the sufferer, and caressed by her, he hung his head, and appeared to be so miserable, that apprehensions were entertained of malady on his part. There was no apparent alteration in the invalid, nor was any one conscious that her death was nearer than it had been for the previous month till the last twelve hours, when, for that period, and for some hours after all was over, no one thought of the dog. The daughter of the lady then quitted the room, and, missing the dog, looked for him in his hiding-place, and there saw him curled up and trembling; she was about to let him take a last look at his beloved mistress, but he laid his head upon her shoulder, and appeared to be so much distressed that she carried him away immediately. On the following day, as she passed the door of the same room, which was always locked, accompanied by the dog, he looked up in her face, as much as to say, "Are you going in there?" but she replied, "No;" and the dog never asked again for

entrance. The coffin was soldered down and removed from the bed-room to the dining-room, and thus had to pass the drawingroom in which the family was assembled. On ordinary occasions the dog was furious at the sound of strange footsteps in the house, and even barked loudly when any one knocked or rang at the street door; at this time, however, he suffered the men employed to pass and repass frequently without making the slightest noise: but, that he was conscious of some unusual occurrence was evident from his jumping, unbidden, into the daughter's arms; and when the coffin was brought down, he sat with ears erect, eyes fixed, and panted and trembled in the most agitated manner till all was quiet. As long as the body remained in the house, he took every opportunity of walking round it, and lying down under it, and when it was removed at 5 o'clock one morning, to be conveyed to the family vault, he was again much agitated, but never offered to bark. On the following day, at the same hour, the family started to attend the funeral at a considerable distance, and the grand-daughters were to arrive at 8 o'clock, in order to pass the day in the house of the deceased. On leaving the dog, the daughter placed him on a mat in the hall, saying to him, "Stay there till the girls come;" he laid himself down, not offering to go, as he had hitherto done when any one went out, and the servants declared, that he never moved from the mat till the young ladies arrived, when he met them with subdued looks; he attached himself to them all day, and, when the rest of the family returned, two



hours after midnight, he met them with great demonstrations of joy. In a few hours he resumed all his usual habits, barking at every one who approached the house. Four years after he died in the same corner which has been already mentioned as his retreat in time of trouble.

The eyes of Foxes are like those of cats in full light; they live in holes which they form for themselves, and emit a fetid odour. They are black, red, yellow, bluish, and variegated in colour, and in cold countries are generally white. They have occasionally been tamed, have become attached to their masters, and even to the dogs with whom they have been accustomed to live.

The *Hyæna venatica* is the size of a wolf, has large ears, black at the end, and is white, tawny, grey, and blackish in colour. It is called the Wild Dog of the Cape, where it lives in numbers.

The foremost grinders of the Civets sometimes fall out. Their tongue is set with sharp rough papillæ, and under their tail is a pocket, into which two glands discharge an unctuous matter, like pomatum, which is sold as musk; but besides this secretion they have another, which is extremely disagreeable. They are kept in Abyssinia for the sake of trading in their perfume. The Bengal Civet is the Kuttauss of India, and emits so strong and rancid a smell, that if dogs by chance come across its track, they are unable to hunt anything else during the rest of the day.

Genets draw back their nails in the manner of cats;

are beautifully marked with black or brown spots on a grey ground; have a black muzzle, and white patches about the head. Their tail is as long as the body, and is ringed with black. They constantly prowl round villages at night in search of prey, and are about the size of a very large domestic cat.

The Ichneumon is grey or brown in colour, with black bands. The Egyptian species, so celebrated among the ancients, has a long tail, which ends in a tuft. It feeds on the eggs of crocodiles and small animals, and when domesticated, which is easily accomplished, feeds on mice and reptiles. The Europeans of Cairo call it Pharaoh's Rat; and the histories related of its destroying crocodiles, by creeping inside them as they sleep with their mouths open, are mere fables. The Ichneumon of India is famous for overcoming the most dangerous serpents, and for making known to man the root of the *Ophiorhiza Mangos*\* as an antidote to the bite of these creatures.

## TABLE XI.

### Division 3.

#### GENUS I. HYÆNA. *Hyènes*.

Three false grinders above, four below, all conical, blunt, and singularly thick; upper carnivorous tooth with a tubercle within, and in front; none to the lower, but which has two strong sharp points; tongue rough; four toes on each foot; a deep and glandular pocket under the tail.

\* This is a plant belonging to the Gentian family.

GENUS II. FELIS. *Cats, Chats.*

Muzzle short and round ; jaws short ; retractile nails ; two false grinders above and below ; upper carnivorous tooth with three lobes, and a blunt heel within ; lower with two pointed and sharp lobes, but no heel ; one very small, tuberculous tooth above.

The last subdivision of Digitigrada (Table XI.) contains the most sanguinary animals of the whole class. The first genus is that of Hyæna, the very name of



which seems to convey an idea of ferocity and cruelty, but which, like many other generally accepted reputations, is not true to the extent

of the report. Hyænas certainly devour everything within their reach, but their extreme cowardice renders them much less formidable than other Carnivora. The uncle of the author frequently encountered them in his garden at Tantom Quarry, on the leeward coast of Africa, but they fled at his near approach, without the least attempt at molestation. Mr. Burchell, the South-African traveller, proved that they are capable of affection, as one which he had in a measure tamed was extremely jealous if it saw him caress any other animal. M. Frederick Cuvier relates an anecdote of a hyæna which strongly proves its capability of attachment. The teeth of hyænas enable them to break the strongest bones of their prey. The vertebræ of their neck often become stiffened, so as to have given rise to the assertion that they have

but one in this part. The muscles which move them and their jaws are so strong, that it is almost impossible to force them to quit any object which they may have seized; and the Arabs consequently make them the symbol of obstinacy. In the East Indies they are striped, but those of Africa have black spots upon a tawny ground. They feed upon every species of flesh, and even rake up graves in order to reach dead bodies. The natives of the western coasts of Africa tell many stories of the power which hyænas possess of imitating the cries of other animals, and declare that they hide themselves in the bush\*, and, by bleating like goats, induce these animals to come to them, when they fall upon and devour them. Their usual cry is like that of a maniac; and this, in the stillness of night, with the broad ocean on one side and a mighty forest on the other, creates a sensation of awe. The author has been more than once startled by the seeming laugh of a madman near her window under such circumstances, but which was no more than the cry of one hyæna to another under the walls of the fortress where she resided. She has been assured by a gentleman who had long dwelt in Africa, that the imitative powers alluded to above are not exaggerated, for he had a proof of them when commanding a fort on the coast. Some women from the neighbouring village were accustomed to pass the walls in search of water, at his dinner-hour after sunset, and made so much noise

\* Forest.

that he desired them to take another path. The next evening the noise recurred, and the same order was repeated the ensuing morning, on which the women protested that they had gone quite another way. On the third evening, when the laughing and talking was apparently recommencing, a serjeant sallied forth to bring the delinquents into the fort; but to his surprise there were only three hyænas in the path, whose imitations of human sounds had deceived all who heard them on the preceding occasion.

The Genus Cat is more strongly provided with weapons than any other: their nails, when drawn back into the skin, remain upright, so that their sharp points and edges are never worn with walking. They vary in size and colour, from the lordly lion to the creature which lies upon our hearth; and the former, from its size, courage, strength, and grand beauty, deserves to be noticed before the rest. As civilisation spreads over the earth, all these ferocious beasts gradually disappear; and the Lion, which least of all beasts of prey associates with man, or comes into his vicinity, becomes more and more scarce, and is now only found in the interior of Africa, and some parts of Asia. His head is square, and his colour tawny; the end of his long tail has a tuft upon it, and a noble mane covers his neck and shoulders, an ornament of which the female is destitute. Mr. Waterton, in one of his beautiful essays, remarks, that "the dog and the lion are both most formidable foes to an unarmed man; and it is singular enough, that the very resistance which he would be

forced to make, in order to escape being worried by the former, would inevitably expose him to certain destruction from the claws and teeth of the latter. All animals of the Dog tribe must be combated with might and main, and with unceasing exertion, in their attacks upon man; for, from the moment they obtain the mastery, they worry and tear their victim as long as life remains in it. On the contrary, animals of the Cat tribe, having once overcome their prey, cease for a certain time to inflict further injury on it. Thus, during the momentous interval from the stroke which has laid a man beneath a lion, to the time when the lion shall begin to devour him, the man may have it in his power to rise again, either by his own exertions, or by the fortuitous intervention of an armed friend. But then all depends on quiet, extreme quiet, on the part of the man, until he plunges his weapon into the heart of the animal; for if he try to resist, he is sure to feel the force of his adversary's claws and teeth with redoubled vengeance." The lion will seldom make the first attack on man unless driven to it by extreme hunger; and several travellers relate anecdotes of passing close to them unharmed. The following account of a lion-hunt is related by Mr. Philips, of Glendour in Albany, a settlement behind the Cape of Good Hope. "The lion abandoned the grove of Mimosas, and we followed him in full cry across the open plain, the dogs howling and barking, we hallooing, the lion in full view making for a small copse about a mile distant, and the great number and variety of antelopes on our

left, scouring off in different directions, formed altogether one of the most animating spectacles. Diederick Muller and Lieutenant Sheppard were foremost; Christian Muller gave the signal to dismount when we were about 200 yards from the copse. He desired us to be quick in tying the horses, which was done as fast as each came up; and now there was no retreating. We were on lower ground than the lion, with not a bush around us. The plan was to advance in a body, leaving our horses with the Hottentots, who were to keep their backs towards the lion, for fear they should become unruly at the sight of him. These preparations occupied only a few seconds, and they were not completed when we heard him growl, and imagined he was making off again. But no; as if to retrieve his character from suspicion of cowardice for his former flight, he had made up his mind to attack in his turn. To the growl succeeded a roar, and in the same instant we beheld him bearing down upon us, his eye-balls glistening with rage. We were unprepared; his motion was so rapid no one could take aim; and he furiously darted at one of our horses while we were at their heads, without the possibility of our preventing it. The poor horse sprang forward, and with the force of the action wheeled all the other horses round with him. The lion likewise wheeled, but immediately crouched at ten yards from us. Our left flank thus became exposed, but on it fortunately stood Christian and Mr. G. Rennie. For a few seconds we beheld the monster at this little

distance, meditating, as it were, on whom he should first spring. Never did I long so ardently to hear the report of a gun. We looked at our companions while they aimed, and then at the lion. It was absolutely necessary to give him a mortal shot, or the consequences might be fatal to some of the party. A second seemed a minute. At length Christian fired. The under jaw of the lion dropped, blood gushed from his mouth, and he turned round with a view to escape. Mr. Rennie then shot him through the spine, and he fell. At this moment he looked grand beyond expression. Turning towards us, he rose upon his fore feet, his mouth gushing blood, his eyes flashing vengeance. He attempted to spring at us, but his hind legs denied him aid. He dragged them a little space, when a period was put to his existence by shooting him through the brain. He was a noble animal, measuring nearly twelve feet from the nose to the tip of the tail."

The Tiger stands as high as the Lion, but is of a slenderer make, has a rounder head, and is brighter in colour. It is white underneath, and has broad, transversal, black stripes on the back and sides. It is the most sanguinary of all quadrupeds; and the strength of its fore paws, the rapidity of its movements, the distance which it leaps, make its vicinity most dangerous: it has even been known to drag a rider from his horse, in order to make him his prey. The movements of the Tiger and other species of *Felis* may be well conceived by watching those of the Cat: these latter crouch in the same manner



when preparing to spring, and in all their actions are miniature representations of their larger brethren. All are equally sensible to sudden noises; and, by adopting such means, tigers have more than once been startled from their intended victim. A brother of the author was returning to his house after dining with another officer, and was met by his servants who were making a great clamour, in order, as they said, to frighten away a tiger which was known to be prowling in the neighbourhood. Although he had been some years in India, the young soldier had never seen a tiger, except at a distance; and, his curiosity being excited, he determined on waiting by the side of the path to gratify it, and dismissed his servants to a place of safety; he then seated himself opposite to the jungle, that he might watch for the enemy. The animal soon appeared, and the bright moonlight discovered all his proceedings. He stealthily approached; then, crouching down, was about to spring upon his victim; but the officer, taking off his bear-skin cap, shouted within it as loudly as he could, which so startled the tiger, that it turned round, and in a moment disappeared among the bushes.

Every variety of Jaguar, Panther, and Leopard is remarkably beautiful, their skin being of a bright rich colour, more or less spotted with black; and they appear to be more susceptible of kindness than the Tiger, for they are frequently tamed. A panther has been already mentioned in this work when speaking of *Quadrumana*: he was docile and affectionate, and as gentle as his strength would permit; he would

draw his claws back when commanded to do so; and on one occasion, when he was ill, the boy who had charge of him slept in his narrow den, holding him in his arms, and the animal appeared to be soothed by the presence of his attendant. He had a remarkable preference for white persons, probably because they had tamed him; and the author was his peculiar favourite. Twice in each week she used to take him some lavender water in a cup made of stiff paper, which he seized with great eagerness, and rolled himself upon it with delight. He suffered some children to play with him, and even to pull him from the window (from which he liked to gaze on what was passing below) by the tail; and his happiness at seeing his master, after vainly searching for him in various directions, was excessive: he made a spring upon him, much, however, to the master's alarm, but which was soon relieved by the panther resting his head upon his shoulder, and then rubbing his head against him, asking for caresses. In their wild state, however, these animals are often very destructive, for they leap over high walls in search of prey, enter towns, and even houses. A large panther at Annamaboo killed seven persons in one week, among whom was a little girl who was bringing up as an attendant upon the author. The animal leaped in at an open window; but the screams

of the child, who was alone in the room, awakened her father, and coming to her assistance he frightened the panther back through the same aperture, but too late to save her: none of her wounds were mortal, but they weakened her so much that she died of them in a few days: some of them resembled those made by a knife. Being an object of superstitious reverence in that part of Africa, few there like to kill a panther; but on this occasion the man paid a fine to the priest, caught the panther, killed it, and made a present of the skin to the author. A woman in the same place bore the marks of an attack made upon her by one of these formidable creatures: she had a child at her back, and her maternal feelings gave her courage; so when the panther sprang upon her, with the hand which she had at liberty, she beat the panther so severely about the eyes, that he let go his hold, and made his escape.

The Jaguars come from America, and one of them, confined in the menagerie of Paris, was suffered to go every fine warm day into a small inclosure covered with grass and surrounded by a high paling; and the author, in company with Mademoiselle Cuvier, was in the habit of letting him out and taking him back in the evening. They frequently suffered him to walk with them round the menagerie when the gates were shut, and he was contented to remain by their side with no other restraint than their hands twisted in the loose skin at the back of his neck.

The Couaguar is called the Lion of America; but it has no mane.

There are many varieties of *Lynx*, but all have a tuft of hair on the tip of each ear; their tail is short,

and they are more or less spotted. The species is still found in the Pyrenees and the mountains near Naples.

The Cat is originally from the forests of Europe, and in its wild state is of a greyish-brown colour with darker transversal bands. These animals are generally deemed deceitful and ungrateful, but many examples of attachment in some measure remove the stigma. They are not, it is true, as capable of affection and submission as the dog, but much may be done with them by education. A violent, ill-tempered kitten may be transformed into a fond, gentle creature by patience and firmness; and an example of this came under the observation of the author. The animal in question is now greatly attached to the lady who tamed her rebellious spirit, but she continues very bold and sagacious.

To the characters already given of Amphibia may be added their long and slender body, their flexible spine, provided with muscles, which enable them to bend it, and their whole formation admirably adapted for swimming. They are divided into two genera.

## TABLE XII.

### ORDER III. CARNIVORA.

#### FAMILY III. CARNIVORA PROPER.

##### Tribe 3. AMPHIBIA.

##### GENUS I. PHOCA. *Seal*.

Four, or six incisors above, four, or two below; pointed canines; twenty, twenty-two, or twenty-four grinders, all sharp or

conical ; five toes on each foot, those of the fore feet decrease from the great to the little toe ; on the hind feet, the great and little toe are the longest ; tail short.

Subgenus 1. **PHOCA PROPER.** — No external ears.

Section 1. **CALOCEPHALES.** Six incisors above, four below.

2. **STENORRHINQUES.** Four incisors above, four below ; grinders deeply divided into three points.

3. **PELAGES.** Four incisors above and below ; grinders with obtuse cones, having a heel before and behind.

4. **STEMMATOPES.** Four incisors above, two below ; grinders compressed, slightly trilobate with thick roots.

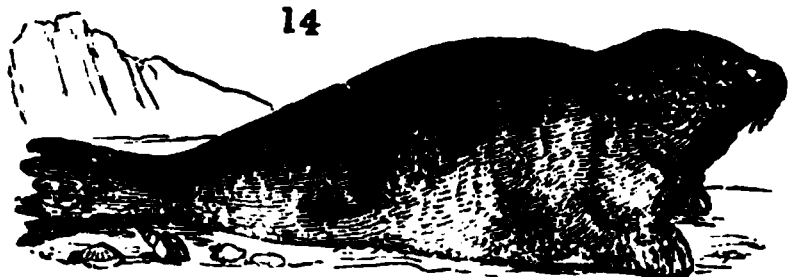
5. **MACRORHINES.** Incisors and grinders like those of the Stenmatopes ; muzzle in the form of a short and moveable trunk.

Subgenus 2. **OTARIES.** External ears.

**GENUS II. TRICHECHUS.** *Walrus, Horses.*

No incisors or canines below ; jaw compressed in front ; two enormous canines in the upper jaw ; two grinder-like incisors between them ; four grinders everywhere, cylindrical in form, and obliquely truncated.

The first of these genera contains the Seals, whose fore and hind feet are enveloped in skin. Their head resembles that of a dog, and their countenance is



gentle and intelligent, keeping pace with their docility, and the attachment which they evince towards those who feed them. Their tongue is smooth and notched

at the end; they live upon fish, and when they dive, their nostrils close with a valve. They have an abundance of black blood. Seals proper have a certain degree of movement in their toes, which are terminated by pointed nails, placed at the edge of the membrane which unites them. The only known species of *Stenmatope* is from seven to eight feet long, and has the power of pushing out the loose skin of its head into a sort of hood, with which it covers its eyes when attacked, and at such times its nostrils swell like bladders. It is an inhabitant of the Frozen Ocean. The *Macrorhines* are the largest of all seals, measuring from twenty to twenty-five feet; they swell their trunks when angry; are found in the Pacific Ocean, at Terra del Fuego, and New Zealand, and yield an abundance of oil. The incisors of the *Otaries* have a double edge, a formation which is not known in any other animal. The toes of their fore feet are almost immovable, and the membrane of those behind is prolonged into a sort of strap beyond each toe; their nails are thin and flat, and one species has a thick, closely curled mane.

The Walrus resembles the Seal in its limbs and the general form of the body, but differs in the head and teeth. Its tusks are sometimes two feet long, and thick in proportion. The sockets of these are so large that they push out the muzzle, and cause the nostrils to be directed upwards, instead of terminating that part. Some naturalists refuse to admit the grinder-like incisors between the tusks as true incisors. The species bearing the name of Sea Cow or Sea Horse

inhabits all parts of the Frozen Sea, and is larger than the largest European bulls: it is frequently twenty feet long, and is covered with a short, yellowish fur. It yields a quantity of oil, and the ivory of its teeth is said never to change colour. Its skin makes excellent coach braces, and it feeds on sea weeds as well as animal substances.

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## ORDER IV. MARSUPIALIA,

OR, ANIMALS WITH POCKETS.

THE singular formation and premature birth of the Marsupialia have been already mentioned in the general table of orders. Incapable of motion, with scarcely a vestige of limbs and external characters, the young Marsupialia generally attach themselves to the teats of their mother, which are situated within the pouch or pocket, and there hang until they are as much formed as the young of other animals when first born. The pouch or pocket varies in size, and is formed by the skin of the belly, more or less prolonged into a fold, and to which, in the larger kinds, the young resort in times of danger, long after they are able to run. It is scarcely perceptible in the males, and in a few species of the Opossums and the Koalas is so small, that the young are carried on the back of the mother, to whose tail they attach their own; but all have the two peculiar bones which support this curious appendage. Were they not all united by this com-

mon character, they would be divided by naturalists into several orders, according to their dentition and their organs of digestion ; but as they, in this respect, stand apart from all others, it has been deemed advisable to keep them together, as will be seen by Table XIII.

## TABLE XIII.

## CLASS I. MAMMALIA.

## ORDER IV. MARSUPIALIA,

Or, Animals with Pouches or Pockets.

- Division 1. Two long canines ; ten small incisors above, eight below ; back grinders set with points.
2. Two large, pointed incisors with sharp edges, and leaning forwards in the lower jaw, six in the upper ; long and pointed canines in the upper jaw ; lower canines very small, or none ; opposable great toe, without a nail ; two first toes often united as far as the last joint.
3. Incisors, upper canines, and united toes like the preceding division, but no great toe on the hind feet, and no lower canines.
4. No canines ; in other respects like the two preceding divisions.
5. Two long incisors ; no canines in the lower jaw ; two long incisors in the middle of the upper jaw ; some small incisors on each side ; and two small canines.
6. Teeth of the ensuing order (Rodentia), with which they form a link ; lower jaw articulated like that of Carnivora, and pocket of the Marsupialia.



## Division 1.

GENUS I. DIDELPHIS. *Opossum, Sarigues.*

Three anterior grinders compressed, and back grinders of upper jaw triangular; those of the lower, oblong; fifty teeth in all; tail prehensile, partially naked.

Subgenus 1. CHIRONECTES. Brown above; three transversal grey bands, interrupted in the middle; white underneath.

2. THYLACINUS. No great toe; two incisors less in each jaw, making only forty teeth; tail hairy, not prehensile.

3. PHASCOGALA. Forty teeth; middle incisors the longest; very short great toe; tail not prehensile.

## GENUS II. DASYURUS.

Two incisors and four grinders less than in the Opossums, making forty-two teeth; tail with long hairs; not prehensile; great toe like a tubercle, or none.

GENUS III. PERAMELES. *Thylacis.*

Great toe like a tubercle, the two first toes united by a skin as far as the nails; great and least toe of the fore foot like tubercles; ten incisors above, those which are external, pointed, and wide apart, only six below; grinders like those of the Opossums, making in all forty-two teeth; tail hairy, and not prehensile.

## Division 2.

## GENUS. PHALANGISTA.

Subgenus 1. PHALANGISTA PROPER. *Balantin.* — Each of the four back grinders above and below presenting four points in two rows; one in front, which is thick, conical, and compressed; and between this and the upper canine, two which are small and pointed, those which answer to them in the lower jaw very small; tail prehensile.

**Subgenus 2. FLYING PHALANGISTA.** The skin of the flanks more or less extended between the legs, and enabling them to remain in the air for some moments, and to make wide leaps; some have very small lower canines.

Division 3.

**GENUS. HYPsiprymnus.** *Potoroos, Kangaroo Rat.*

Pointed canines above; two middle incisors longer than the others, and pointed; two below leaning forwards; one long, sharp, dentated grinder, followed by four others, set with four blunt tubercles; hind legs much longer than those before; no great toes; two first toes united as far as the nails.

Division 4.

**GENUS. MACROPUS.** *Halmaturus, Kangaroo.*

No upper canine; middle incisors not longer than the rest; inequality of legs very great; a large nail on the middle of the hind feet, like a hoof; five grinders everywhere.

Division 5.

**GENUS. KOALA.** *Lipurus, Phascolaretos.*

Clumsy body; short legs; no tail; five toes on the fore feet, divided into two groupings; no great toe on the hind feet, the two first toes of which are united, as in the Phalangista.

Division 6.

**GENUS. PHASCOLOMYS.** *Wombat.*

Thick and flat head; short legs; no tail; five toes on the fore feet; four, with a tubercle, on those behind, each with a long nail; two long incisors in each jaw; grinders each with two prominences.

Opossums were first discovered in America, and possess more teeth than any other quadruped. Their

tongue is prickly; the great toe of their hind feet is long, and much separated from the others, and has no nail upon it. They have large naked ears, and a mouth much cleft. They are fetid, nocturnal animals, with a slow walk; hide themselves in trees, pursue birds, insects, &c. and do not reject fruits. Their young, sometimes sixteen in number, weigh only a grain when born, and open their eyes on the fiftieth day, when they are as large as a mouse; they do not entirely forsake the pocket till they are the size of a rat.

The *Perameles* are found in Australasia, and their long nails show that they dig up the earth, while their long hind feet equally proclaim their power of running fast.

Some of the *Phalangistæ* live in trees, and are natives of the Moluccas, where their flesh is considered delicate eating, notwithstanding the strong smell arising from them.

The Flying *Phalangistæ* come from New Holland, and the largest resemble the *Galeopithecus*. The *Potoroos* are the last *Marsupialia* which preserve any affinity to the *Carnivora*, and are eminently distinguished by their long hind legs, on which they frequently walk, aided by their tail. They are the size of a rabbit.

From the length of their hind legs, *Kanguroos* walk with difficulty, but their leaps are vigorous, and, while they support themselves on one foot and on their strong tail, they are able to inflict heavy blows with the other foot. They feed on grass. The giant *Kangaroo* is sometimes six feet high, and is the

largest animal in New Holland. It was discovered by Captain Cook, and its flesh resembles that of venison. They are all timid animals with a beautiful head, and live in troops conducted by the old males. Their young retire into the pocket of their mother, even after they are able to graze, and put their heads out to do so while she is feeding.

It is impossible to class the Wombats satisfactorily, from their affinity to Rodentia in teeth and intestines, and at the same time their resemblance in other internal characters and pouch to the Marsupialia. Their nails are adapted for digging; they walk very slowly, feed on grass, are the size of a badger, and become as familiar as a dog. They come from Southern Australia.



## ORDER V. RODENTIA.\*

Two large incisors in front of each jaw serving as files; grinders with flat crowns.

THE two large incisors in each jaw of the Rodentia, separated from the other teeth by a void space, ren-

\* Taken from the Latin word *rodens*, gnawing.

der them but little able to seize a living prey, or to tear flesh; they do not even serve for cutting food, but they act as files, and, by continual friction, reduce it into those particles which render it fit for digestion. With these weapons the Rodentia attack the hardest woods, and derive their nourishment from them, as well as the toughest bark. In order to fit the incisors for the task which they have to perform, the enamel which usually accompanies each surface of all teeth only exists in front, and, consequently, the inner edge becomes worn, and creates a slope towards the top of the tooth, a form admirably adapted to the use made of them, but which would in time utterly destroy them, were it not that each loss of substance is supplied by growth from the root. A proof of this may be seen when one of the incisors is broken, in which case that above and opposite to it becomes monstrous. The jaws of Rodentia are feeble, and articulated longitudinally, so that the lower jaw can only move backwards and forwards, but which is the most convenient for the process of gnawing. Those whose grinders present flat, or nearly flat, crowns, and those who have the tips of these teeth projecting in simple lines, are more exclusively frugivorous; those which have small tubercles on the grinders are omnivorous; and those where the surface is raised in small points attack other animals, and approach the Carnivora. The hinder parts of Rodentia are generally longer than those in front, so that they leap rather than walk, some even as much so as the Kanguroos. Others have very small, or, in

fact, scarcely any collar bones; but those in whom these are most developed carry their food to their mouth with their fore paws, and climb trees with the greatest facility. Such are the Squirrels, for whose dentition see Table XIV.

TABLE XIV.

CLASS I. MAMMALIA.

ORDER V. RODENTIA.

GENUS I. SCIURUS. *Squirrel, Ecureuil.*

Lower incisors much compressed; long bushy tail; four toes on the fore feet, five on those behind; four tuberculous grinders, and a very small one in front of them in the upper jaw.

Subgenus 1. SQUIRRELS PROPER. — Hairs of the tail directed sidewise, like a large feather.

2. TAMIA. Pouches to the cheeks.

3. GUERLINGUETS. Long tail, almost round.

4. PTEROMYS. *Flying Squirrels, Polatouches.*—The skin of the flanks extending between the legs; feet with long bony appendages which support the skin.

5. CHEIROMYS. *Aye-Aye, Madagascar Squirrel.*—Lower incisors much compressed, and leaning backwards; five toes on each foot; four of those on the fore feet excessively long; the middle much more slender than the others; great toe of the hind feet opposable.

GENUS II. MUS. *Rat.*

All the Rodentia possessing clavicles which cannot be grouped under any other character common to them all.

- Subgenus 1. **ARCTOMYS.** *Marmot, Marmottes.* — Lower incisors pointed; five grinders above, four below, all set with points; four toes and a tubercle on the fore feet, five on the hind feet.
2. **SPERMOPHILES.** Like Marmots, but having pouches.
3. **CYNOMYS.** Five toes on each foot.
4. **MYOMYS.** *Dormouse, Loris.* — Lower incisors pointed; four grinders everywhere.
5. **ECHIMYS.** *Spiny Rat, Lonchères.* — Four grinders everywhere, those above formed by two plates folded like a V; the lower formed of one folded and one simple plate.
6. **HYDROMYS.** Hind feet palmate in two thirds of their length; two grinders everywhere, the crowns of which are divided into obliquely square lobes, and the summits of which are hollow like a spoon.
7. **CAPROMYS.** *Houtias.* — Four grinders everywhere with flat crowns; tail round; five toes on the fore feet, four on those behind, with the rudiment of a great toe.
8. **MUS PROPER.** *Rats, Mice.* — Three grinders everywhere, the foremost of which is the largest, the crowns divided into blunt tubercles, which, by being worn, are sloped in different ways; long scaly tail.
9. **GERBILLUS.** *Meriones, Gerbiles.* — Grinders like those of rats, which, when worn, present transversal eminences; upper incisors hollowed into a furrow; tail long and hairy.

Subgenus 10. **MERIONES.** *Merion.* — Hind feet longer than the preceding; a very small tooth before the upper grinders; tail nearly naked; teeth and toes of the Gerbilles.

11. **CRICETUS.** *Hamsters.* — Same teeth as rats; tail short and hairy; pouches in the cheeks.

12. **ARVICOLA.** *Campagnols.* — Three grinders everywhere, without roots, and like triangular prisms placed alternately in two rows.

Section 1. **FIBER.** *Ondatras.* — Hind feet semi-palmate; long, compressed, scaly tail.

2. **HYPUDÆUS.** *Arvicola Proper.* — Tail hairy; feet not palmate.

3. **GEORUCHUS.** *Lemmings.* — Tail and ears very short; fore toes proper for digging.

4. **OTOMYS.** — Three grinders everywhere, composed of plates slightly curved, placed one after the other; incisors with a groove; tail and ears hairy.

13. **DIPUS.** *Jerboa, Gerboises.* — Teeth of rats with several small ones sometimes placed before the upper grinders; tail long and tufted at the end; disproportionably long hind legs, the feet of which have three toes, and small lateral toes; fore feet with five toes.

**GENUS III. HELAMYS.** *Pedetes, Lièvres, Sauteurs.*

Four grinders everywhere; five toes on the fore feet having long pointed nails, four toes on the hind feet, terminated by large nails resembling hoofs; lower incisors truncated; hind legs long.

**GENUS IV. SPALAX.** *Mole-rat, Rats, Taupes.*

Three tuberculous grinders everywhere; incisors too large to be covered with the lips; the extremities of those below like a wedge; legs very short; five toes on each foot, with five flat, thin nails; tail short or none.



GENUS V. BATHIERGUS. *Oryctères.*

Four grinders everywhere; tail short.

GENUS VI. GEOMYS. *Pseudostoma, Ascomys.*

Four compressed grinders everywhere; upper incisors with a double furrow; five toes on each foot; three middle nails before, very long, especially that of the middle toe; deep pouches.

## GENUS VII. DIPLOSTOMA.

No tail.

GENUS VIII. CASTOR. *Beaver.*

Tail flattened almost into an oval, and covered with scales; five toes on each foot, those behind united by membranes; a double and oblique nail on that which follows the great toe; four grinders everywhere, made like a bony ribbon.

GENUS IX. COUÏA. *Myopotamus.*

Like Beavers with round tails.

GENUS X. HYSTRIX. *Porcupine, Porc-epics.*

Pointed spines all over the body; four grinders everywhere, with flat crowns; tongue hairy; spiny scales.

Subgenus 1. PORCUPINE PROPER.—Head more or less swelled; four toes before, three behind with large nails.

2. ATHERURES. — Tail long, but not prehensile.

3. URSONS. *Erétissons.* — Skull flat; muzzle short; prickles short, half hidden in the skin.

4. SYNETHERES. *Coendous.* — Muzzle thick and short; head swelled in front; short spines; tail long, naked at the end, and prehensile; four toes on each foot.

GENUS XI. LEPUS. *Hare, Lièvres.*

A double row of upper incisors, those behind the smallest; five grinders everywhere; above is a sixth, which is very small; five toes before, four behind.

Subgenus 1. **HARES PROPER.** — Long ears; short tail; hind feet longer than those before.

2. **LAGOMYS.** *Pica.* — No tail; moderate ears; legs nearly equal.

**GENUS XII. HYDROCHÆRUS.** *Cabiais.*

Four toes before, three behind, with large nails, and united by membranes; four grinders everywhere.

**GENUS XIII. CAVIA.** *Anæma, Guinea-pig, Cobayes, Cochons d'Inde.*

Toes separate.

Subgenus 1. **KERODON.** *Mocos.* — Grinders formed of two triangular prisms.

**GENUS XIV. CHLOROMYS.** *Dasyprocta, Agoutis.*

Four toes before, three behind; four grinders everywhere, those above sloped within, and those below sloped without.

**GENUS XV. CŒLOGENYS.** *Pacas.*

Teeth like those of the Agouti; five toes on each fore foot, one of which is very small, and six on the hind feet, two of which are very small.

The winter fur of Northern Squirrels supplies that which is called American Squirrel. Some of the Squirrels from warm countries are beautifully striped; those of America have no tufts upon their ears; all have quick and prominent eyes, and are capable of much affection. A mother, who wept the loss of her only daughter, was surprised one day by the favourite squirrel of the young lady climbing up to her shoulder, caressing her with its head, nestling itself into her neck, and even drinking her

tears; and, as long as it lived, it was never caressed by the mother without first looking in her face for the drops which it had been accustomed to remove.

The Aye-Aye presents a singular and frightened



16 appearance: with its long, slender, middle toe, it conveys food to its mouth. Its skull resembles that of *Quadrumanus*; it is as large as a hare, is of a chesnut colour, has a long, thick tail, naked ears, is nocturnal, moves slowly,

lives in holes, and is a native of Madagascar.

There is perhaps no quadruped on earth so widely diffused as the genus *Rat*, and, notwithstanding its comparatively small size, there is none equally destructive. Some of the species of *Marmot* eat flesh, as well as insects and grass. They have short legs and tails, flattened heads, and pass the winter in a state of torpor, hiding themselves in holes, the mouths of which they stop up by a quantity of hay. They dwell in societies, and one species lives close to the edge of perpetual snows on the Alps. When their provisions are exhausted, they often eat one another.

The subgenus *Cynomys* contains those *Rodentia* which live in large troops, burrow like rabbits in the vast prairies of America, and, from the barking noise which they make, resembling that of a small dog, they have received the common name of *Prairie Dogs*. The following account of them is given by Washington Irving in his *Tour on the Prairies*:—

“On returning from our expedition, I learned that a great burrow, or village, as it is termed, of Prairie Dogs, had been discovered on the level summit of a hill, about a mile from the camp. Late in the afternoon I set out with a companion to visit it. The Prairie Dog is a little animal of the coney kind, about the size of a rabbit, of a sprightly nature, quick, sensitive, mercurial, and somewhat petulant: he is very gregarious, living in large communities, sometimes of several acres in extent, where the well-beaten tracks show the constant mobility and restlessness of the inhabitants. They seem, in fact, continually full of sport, business, and public affairs; whisking about, hither and thither, as if on visits to each other's holes; congregating in the open air, and gamboling together in the cool evenings, after showers. Sometimes they pass half the night in revelry, barking and yelping with weak tones, like very young puppies; but on the least alarm, they all vanish into their cells, and the village remains blank and silent. Should they be surprised, and have no means of escape, they assume a pugnacious air, and a most whimsical look of impotent wrath and defiance. . . . . It would seem that the sensibilities of these very singular little dogs will not permit them to remain in a dwelling in which they have lost a friend. Unfortunately, the village had been visited in the course of the day by some of the rangers, who had even shot two or three of the citizens. The whole community, therefore, was outraged and incensed: sentinels seem to have been posted on the outskirts, and, on our approach,

there appeared to be a scampering in of the picquet guards to give the alarm ; whereupon the wary citizens, who were seated at the entrances to their holes, gave each a short yelp, or bark, and dived into the earth, as if he had thrown a somerset. We traversed the whole village, which covered an area of about thirty acres ; not a single inhabitant was to be seen. There were innumerable holes, each having a small hillock of earth about it, thrown out by the little animal in burrowing. Moving off quietly to a little distance, we lay down upon the ground, and watched for a long time, silent and motionless. By degrees, some cautious old citizen would slowly put forth his nose, but instantly withdraw it ; others, farther from us, would emerge entirely, but, catching a glance of us, would throw a somerset, and dive back into their holes. At length the inhabitants of the opposite side of the village, taking courage from the continued stillness, would steal forth, and hurry off to a distant hole, as if to the residence of some relative or gossiping friend. Others, still more bold, assembled in little knots in the streets and public places, to discuss the recent outrage offered to the commonwealth, and the atrocious murder of their fellow-citizens. We rose from the ground and moved softly, to reconnoitre them more distinctly, when, yelp ! yelp ! yelp ! passed from mouth to mouth. We caught glimpses of twinkling feet in every direction, and in an instant, all had vanished into the earth. . . . . Late in the night, after our return from the camp, we could hear a faint clamour from the distant village, as if the inhabitants

were lamenting in general assemblage some great person that had fallen in their commonwealth."

Dormice live in trees like squirrels, eat fruits, and, in cold countries, pass the winter in a state of torpor. The large species which inhabits the south of Europe is probably the rat which the ancients used to fatten, and esteem so great a delicacy for the table.

The Spiny Rat, as its name betokens, has bristly hairs, often mingled with flat prickles.

The Capromys is like an enormous rat, the size of a hare, and comes from Cuba, where, with the Agouti, it forms the principal game of the inhabitants.

The omnipresence and omnivorous propensities of rats are known to every one. The mouse may be traced in Europe to all times, but rats are supposed to have come from the East during the middle ages, since which period they have spread over the whole world, forming one of the greatest nuisances to which man is liable. In warm countries they grow to an immense size, and the author has been, not only a witness to their depredations, but a sufferer by them during her residence in tropical climates: a vessel in which she sailed could only be cleared of them by sinking her for a time, and it was with difficulty that she kept them from her sleeping apartments. A rather novel way of hunting them was practised in the Gambia, where they used to make numerous nests in the fire-places and chimneys, which were erected against damp, and not cold. The author was one evening sitting at her work in her bed room, and, hearing a slight noise, turned her head, when she saw a large rat on

the table close to her, apparently watching all her proceedings; she continued her employment for a few moments, so as not to alarm the animal, when, stealing gently away, and shutting the door after her, she called the servants, and, in a few minutes, a regular hunt was commenced. Two of the party, armed with sticks, dislodged the rats from their hiding places, and, as the latter invariably ran round the sides of the room, others were stationed at the corners, who squatted down with towels in their hands, which they held open for the rats to rush into: they did this in every instance, when their necks were immediately twisted, and they were thrown aside to be ready for a fresh victim: more than fifty were killed in this manner, and were thrown into the garden, but, by the next morning, all had been taken away by the Genets, who left the prints of their footsteps on the soil.

Hamsters are very destructive, from the quantity of grain which they amass, and with which they sometimes fill holes seven feet long.

Ondatras are like Arvicolæ, and the Musk Rat of Canada belongs to them. It builds mud huts on the ice, in which several live together, and when the frost closes the entrances to their dwellings, they eat one another. The Water Rat belongs to the division Hypudæus; one of the species lives under ground, like a mole, and fills its magazines with pieces of wild carrot.

The Lemming of Hudson's Bay has no external ears, and no tail, is of a pearly grey colour, and the

two middle toes of the fore feet appear to have double nails, in consequence of the callous nature of the skin at the end of the toe, which projects under the nail, and is a formation peculiar to this animal.

The long legs of the Jerboas caused them to be called "Two-footed Rats" by the ancients. They almost always leap, instead of walk, live in holes, and sleep during the winter.

Mole Rats have excessively small eyes, covered with skin and hair, and no external ears. They live under ground, like moles, and feed on roots.

Beavers commence a larger and stronger series of Rodentia than those hitherto mentioned, several of which have distinct collar bones. The toe next to the great toe of the hind feet has a double and oblique nail. Their life is wholly aquatic; they chiefly eat bark and other hard substances, and cut down trees with their strong incisors. They have large glandular pockets under their tail, which produce a pomatum of a strong smell, called *castoreum* by the druggists. Their size exceeds that of the badger. They select those waters for their dwellings which are too deep to be frozen to the bottom, and, as often as possible, running streams; and, by cutting wood



above the current, it is carried down by it to the place which they wish to inhabit. They keep the water at an equal height by a dam made of branches mixed with stones and mud, which they strengthen every year, and which at length vegetates and becomes a hedge. Each hut has two floors, and serves for two or three families: the upper, which is dry, for the animals to live in; the lower, under water, for stores of bark: the door opens under water, without any communication with the land. The huts are made of branches of trees, interwoven and plastered with mud. They have also several holes along the bank, where they take refuge when their huts are attacked; they only dwell in these huts during winter; and in the summer disperse, and live singly. They are easily tamed, and induced to eat animal food. The Beaver of Canada is of an uniform reddish brown, and its fur is much sought for in the manufacture of hats. Notwithstanding the most minute comparisons, it is impossible to tell whether the Beavers which live in holes along the Rhone, the Danube, the Weser, and other European rivers, are of a different species to those of America, or if their vicinity to man prevents them from building.

Porcupines are easily distinguished by the stiff prickles with which they are covered. They live in holes, and grunt like hogs, which, with their enlarged muzzle, has often caused them to be com-

pared to the latter animals. There is one species in Europe.

The inside of the mouth, and under part of the feet of Hares are furnished with hair like the rest of the body. The common species has very long ears, lives alone, lies upon the open ground, its place of rest being called a form, and its flesh is dark. The Rabbit lives in troops under ground, its habitations being called warrens, and its flesh is white.

The Alpine species of *Lagomys* lives in the highest mountains, and passes the summer in providing hay for the winter. The heaps which it collects are sometimes seven feet high.

Guinea Pigs are often kept in houses, because it is supposed that the smell of them drives away rats.

The Agoutis much resemble hares and rabbits, and are inhabitants of the West Indies, and the warm parts of America. That species which is called the Hare of the Pampas has larger ears than the others, and a very short, naked tail. The zygomatic arch of the Pacas is so large that it causes a cavity in the cheek; their flesh is good eating.

The teeth of the Chinchilla are not sufficiently known to mark its place among the Rodentia, to which class it belongs. It is about the size of a small rabbit; its large ears are half naked, and it is covered with the softest of all furs, except on the tail, where the hairs are harsh. Its colour is grey, the fore feet have four toes, with the vestige of another; those behind have three. It lives in the mountains of South America.

## ORDER VI. EDENTATA.

No teeth in the front of the jaws.

THE name of the sixth order of Mammalia literally means, having the teeth knocked or pulled out, and accordingly we find that the animals which compose it are more or less without teeth in the front of their jaws, or have none at all. They form the last series of unguiculate animals, or those having nails; and these nails so envelop the extremities of the toes as to approach the nature of hoofs. Owing to the manner in which their limbs are set, or jointed, their movements are slow, especially those of the first tribe, to which the name of Tardigrada has consequently been applied. In it Nature has apparently tried to be imperfect and grotesque, as will be seen by referring to the characters of the Sloth in TABLE XV.

## TABLE XV.

## CLASS I. MAMMALIA.

## ORDER VI. EDENTATA.

- Tribe 1. TARDIGRADA. — Grotesque forms and extreme slowness of motion; face short and round.
- Tribe 2. EDENTATA PROPER. — Muzzle pointed; some have grinders.
- Tribe 3. MONOTREMA. — No pocket, but the bones which support it in Marsupialia; collar bones like the merrythought in birds; five nails on each foot; a

spur on the hind foot of the male ; no external ear ; eyes very small.

Tribe 1. TARDIGRADA.

GENUS I. BRADYPUS. *Sloth, Paresseux.*

Cylindrical grinders ; sharp canines longer than the grinders ; toes joined together by the skin, and only marked by enormous, compressed, and crook'd nails ; hind feet articulated obliquely into the leg ; fore legs, or arms, much longer than those behind.

Subgenus 1. ACHEUS. — Only three nails on the fore feet ; a short tail.

2. CHOLÆPUS. *Bradypus Proper.* — Two nails on the fore feet ; no tail ; canines large and more pointed than in others of the genus.

Tribe 2. EDENTATA PROPER.

GENUS I. DASYPUS. *Tatoo, Armadillo.*

A hard scaly coat, composed of bands and compartments, covering the head, body, and frequently the tail ; large ears and nails, four or five before, and always five behind ; muzzle pointed ; cylindrical grinders to the number of seven or ten everywhere.

Subgenus 1. CACHICAMES. — Four toes on the fore feet, the two middle of which are the longest.

2. APARS. — Nine or ten grinders everywhere.

3. ENCOUBERTS. — Five toes on the fore feet, the three middle of which are the longest ; tail nearly covered with scales ; nine or ten teeth everywhere.

4. CABASSOUS. — Five toes on the fore feet, obliquely decreasing in size, and that in the middle having an enormous, sharp nail ; eight or nine teeth every where.

Subgenus 5. **PRIODONTES**.—Toes more unequal than in the preceding sub-genus, and enormous nails ; from ninety-four to ninety-six teeth.

6. **CHLAMYPHORUS**.—Ten teeth everywhere ; five toes on each foot ; nails on the front toes very large, crook'd, and compressed ; back covered with a row of transversal scaly pieces.

## GENUS II. ORYCTEROPUS.

Grinders made like a cane ; flat nails.

GENUS III. **MYRMECOPHAGA**. *Ant-eater, Fourmilliers*.

Long muzzle ; small mouth ; no teeth ; a thread like, extensile tongue ; body covered with hair ; strong and sharp nails on the fore feet, varying in number.

GENUS IV. **MANIS**. *Pangolin, Scaly Ant-eaters*.

No teeth ; tongue extensile ; body, limbs, and tail, covered with large scales, arranged like tiles ; five toes on each foot.

## Tribe 3. MONOTREMA.

GENUS I. **ECHIDNA**. *Tachyglossus, Spiny Ant-eater, Echidnés*.

Long thin muzzle ; extensile tongue ; no teeth ; roof of the mouth armed with several rows of prickles directed backwards ; feet short ; five long, powerful nails on each foot ; body covered with prickles.

GENUS II. **ORNITHORHYNCHUS**. *Platypus, Ornithorinques*.

Muzzle elongated, wide, and flat, looking like the beak of a duck, the edges of which have small, transversal plates ; two teeth everywhere, at the bottom of the mouth, without roots, having flat crowns, and formed of little vertical tubes ; the fore feet with a membrane which unites all the toes, and passes beyond them ; a membrane also unites the toes of the hind feet, but ends at the nails ; tail flattened.

The powerful nails of the Sloth bend towards the sole of the foot when it is at rest, and from the articulation

of the hind feet on to the legs, only the outside edge of the former touches the ground when walking; the toes can only bend one way, and all their bones

adhere together as the animal becomes old. From the length of the fore legs they are obliged to drag themselves along upon their elbows or knees: their thighs are so wide apart that they cannot bring their knees together. They live upon trees, and never quit one till they have stripped it of all its leaves, so averse are they to move to another; and then they are said to fall to the ground rather than take the trouble of descending properly. They have only one young one at a birth, which they carry on their back. Their stomach is divided into four bags.

The subgenus *Acheus* contains the *Ai*, which is the most extraordinary of the whole tribe. It is the size of a cat, grey, spotted with brown and white upon the back. Several of its bones are soldered together; its fore legs are twice as long as those behind, and its long hair hangs over it like faded grass. It has one joint more in its neck than any other animal, and comes from the warm parts of America.

In the second tribe we find the Armadillos, with

their hard coverings  
formed of a buckler in  
front ; a second, very  
large and convex,  
, upon the shoulders ;  
, a third, similar to  
that in front, upon  
the hind part of the  
body ; and between  
these two last, several

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parallel bands, which allow the body to bend. The tail is either covered with rings or tubercles, as are also the legs. There is no enamel on the inside of the grinders ; their tongue is smooth, and a few scattered hairs issue from between the scales, or cover those parts of the body which have no shell. They live in holes, are from the warm or temperate parts of America, and feed partly on insects and dead bodies, and partly on vegetables.

One of the Encouberts differs from the whole genus, by having a tooth on each side of the palate of the mouth. The enormous nails of the Cabassous cleave the ground with rapidity, in which they bury themselves, or fasten upon it so strongly that it is difficult to tear them from it. The back of the Chlamyphorus appears to have a series of plates along the spine ; and their turned-up tail is attached partly under the body, which seems as if suddenly chopped off. They come from Chili, are from five to six inches long, and spend most of their time under ground.

The Orycteropus was long confused with the Ant-

eaters, because it lived on the same sort of food, and its tongue is somewhat extensile. Its teeth appear to be composed of solid cylinders, traversed lengthwise by a number of little canals.

With one exception, all the rest of the Edentata are wholly without teeth. Among them, the Ant-eaters are hairy animals, with their long muzzle terminated by a small mouth, whence issues their slender tongue, covered with a glutinous saliva, in order to secure the ants and termites\*, into whose nests it penetrates, and which adhere to it as it is withdrawn, after their dwellings have been torn open by the long nails of their enemy. These nails turn inwards, and rest upon a hard piece of flesh placed above the foot, so that the ant-eaters can only walk on the side. They inhabit all the warm and temperate parts of the New World, and carry their single young one on the back.

Pangolins also live on ants. Their tile-like scales rise at one edge, so that when the animal is attacked, it is able to roll itself into a ball. They belong exclusively to the Old World; and the natives of Western Africa make caps of their skins, which they wear with the tail hanging downwards. The criers employed to enjoin silence in the court of Ashanti are often thus decorated.

The Monotremæ are the most singular animals in creation. Although they have no pockets like the Marsupialia, they yet have the bones which support

\* White ants.



these appendages. It was for years doubted whether the *Ornithorynchus* had tests, and, in consequence of some eggs having been found in their holes, they were supposed to be oviparous. Recent observations, however, and chiefly those of the learned Professor Owen, have ascertained that they possess these organs, and consequently bring forth living young. They have a second collar bone placed before the usual bones, and common to each shoulder, analogous to the merrythought in birds. The males have a spur on each side of the hind foot, pierced with a channel which leads to a gland inside the thigh. This gland secretes a liquor which is said to be poisonous. Their eyes are very small, and they have no external ears. They all come from New Holland, and are divided into two genera, the first of which has a muzzle like that of the Pangolins and Ant-eaters, and also lives upon ants. Their nails are adapted for digging, and, like the hedge-hog, they roll themselves up at the approach of danger.

The tongue of the *Ornithorynchus* is, as it were, double, for there is one portion in the beak set with prickles, and another, at the base of this, thicker, and furnished with

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two fleshy points at the tip. They are covered with thick and short brown hair, and are extremely ugly, as well as singular looking animals.

## ORDER VII. PACHYDERMATA.\*

No collar bones ; feet furnished with hoofs.

THE preceding order contained animals with nails which resemble hoofs, but all able to bend their toes round different objects, and to seize them with various degrees of strength. A total absence of this power characterises those with real hoofs, and, as they all use their feet for support only, they do not require a collar bone. With this formation, they can only live on vegetables, for they are unable either to seize a living prey with their fore legs, or to carry any description of food to the mouth. There is much less variety of form among them than among animals with nails, and the first series, which forms the Pachydermata, is divided into three families, as set forth in TABLE XVI.

## TABLE XVI.

## CLASS I. MAMMALIA.

## ORDER VII. PACHYDERMATA.

Family 1. PROBOSCIDIANS.—Five toes to each foot, but so encrusted in hard skin as to be only apparent outside by nails attached to the edge ; neither canines nor incisors, but in place of the latter two enormous tusks ; nostrils prolonged into a cylindrical trunk.

\* From two Greek words, meaning thick hide.

Family 2. **PACHYDERMATA PROPER.** — Two, three, or four toes upon each foot; when there is an equal number, the feet are forked.

Family 3. **SOLIPEDA.** One hoof on each foot.

### FAMILY I. PROBOSCIDIANS.

#### GENUS I. ELEPHAS. *Elephant.*

Grinders composed of a certain number of vertical plates, each formed of bone enveloped in enamel, and fastened together by a substance called cortical.

### FAMILY II. PACHYDERMATA PROPER.

Division 1. Forked feet.

Division 2. Feet not forked.

#### Division 1.

#### GENUS I. HIPPOPOTAMUS.

Four toes terminated by small hoofs; six grinders everywhere; the three foremost conical, the three last having two pairs of points, which when worn look like trefoils; four incisors in each jaw, the upper of which are short, conical, and curved backwards; the lower long, cylindrical, pointed, and curved forwards; a canine tooth everywhere; the upper straight, the lower thick, and curved backwards.

#### GENUS II. SUS. *Hog, Cochon.*

Two middle toes large and armed with strong hoofs; two lateral much shorter; number of incisors variable, those below always leaning forwards; canines projecting beyond the mouth and curving upwards; muzzle terminated by a truncated snout.

Subgenus 1. **SUS PROPER.** — Twenty-four or twenty-eight grinders, the foremost more or less compressed; those behind tuberculous; six incisors above and below.

2. **PHACOCERES.** — Grinders composed of cylinders joined together in the manner of those of

the Elephant; skull large; round tusks; a large lobe on each cheek; two incisors above, six below.

Subgenus 3. **DICOTYLES.** *Pecaris, Peccary.* — Canines not projecting beyond the mouth; no external toe on the hind feet; the bones of all four soldered together; no tail.

#### Division 2.

#### GENUS I. RHINOCEROS.

Three toes on each foot; bones of the nose united so as to form a round protuberance, bearing one or two horns.

#### GENUS II. HYRAX. *Damans.*

Four toes on the fore feet; three on those behind, all having small, round, thin hoofs, except the internal toe behind, which has a hooked nail; muzzle and ears short; two strong incisors above, with two very small canines; four incisors and no canines below; size like that of a rabbit.

#### GENUS III. TAPIR.

Twenty-seven grinders everywhere; six incisors and two canines in each jaw, separated from the grinders by a void space; nose like a small, fleshy trunk; fore feet with four toes, those behind with three.

#### FAMILY III.

#### GENUS I. EQUUS. *Horse, Cheval.*

Six incisors in each jaw; their crowns, when young, hollowed into a groove; six grinders with square crowns, marked by the plates of enamel, as if with four crescents; two small canines in the upper jaw of the males, and sometimes in both, but none in the female; one apparent toe within the hoof, but on each side of the feet are two points under the skin, which represent lateral toes; a long mane on the neck, and long hair upon the tail.

The large sockets required by the tusks of the Proboscidiæ so heighten the upper jaw and shorten the bones of the nose, that, in the skeleton, the nostrils are placed at the top of the face. The trunk into which they are outwardly prolonged is composed of several thousands of little muscles, interlaced one within the other in every direction, endowed with exquisite feeling, and terminated by an appendage like a finger. By curving this flexible organ they can convey the smallest substances to their mouth, with the same facility as with the hand; it also supplies the place of a long neck, which would be but ill adapted to sustain the weight of their heavy tusks. Their head, which is enormous in volume, has several cavities in it, which render it lighter. The teats are placed under the breasts, and the young suck with the mouth, and not with the trunk. The single living genus (Elephant) comprehends the largest animals which walk the earth, and the dexterity with which they are gifted by means of their trunk, and their imposing appearance, have caused their sagacity to be greatly exaggerated: it by no means equals that of the dog. They live in herds, conducted by the old males, force their way through mighty forests, by breaking through the jungle, and even uprooting trees of considerable size, using their trunk as a lever, and feeding on the juicy roots. Their grinders, when worn, succeed each other, not from the top and bottom, as those of other animals do, but from behind, so that the old one is pushed forward by the new till it falls out. In this manner,

Elephants may have one or two grinders on each side, above and below, and are said to change them eight times. The first appear to have but few plates, but these increase in each succeeding grinder. They only change their tusks once. They are covered with rough skin, and inhabit the torrid zone of the Old World. The Indian species has a concave forehead, and the crown of its grinders (*b*) looks as if it were composed of undulating ribbons. That of Africa has a convex forehead; the crown of its grinders (*a*) presents a series of lozenges, and its tusks, of equal size in both males and females, are larger than those of the Indian species, as well as its ears. The art of taming it was formerly practised by the Carthaginians, but is lost in the present day, and in the East alone is this animal serviceable to man. All elephants are docile, except when under the influence of fear; but they are apt to take dislikes, and, if once excited, they become ungovernable, lift their victim up with their tusks, and, even when life is extinct, trample upon it, and knead it with their knees, till it becomes almost a jelly. A large Indian elephant in the menagerie of Paris marched from Bordeaux under the care of a lad, who always slept on a mattress in the stable with his charge, but in the morning invariably found himself pushed off his bed, and the elephant in his place. This same elephant was fond of bathing himself in

the pond appropriated to his use, and, entirely hiding himself in it, with merely the orifices at the tip of his trunk beyond the surface of the water, would wait till a numerous assemblage of persons was collected outside the palisades to watch for his rising, when he would send a volume of water over them, and then raise his head, as if to enjoy the fun of seeing them run away. A young elephant from Africa, in the same establishment, was entirely managed by pulling its ears. Mr. Pringle, in his lively and interesting account of "A Residence in South Africa," says, that "their wild cries resemble trumpets, and that a troop of elephants is a truly magnificent spectacle." He adds: "A few days before my arrival at Enon, a troop of elephants came down, one dark and rainy night, close to the outskirts of the village. The missionaries heard them bellowing and making an extraordinary noise for a long time, at the upper end of the orchard; but knowing well how dangerous it is to encounter these animals in the night, they kept close within their houses till day-break. Next morning, on examining the spot where they had heard the elephants, they discovered the cause of all this nocturnal uproar. There was, at this spot, a ditch or trench, about five or six feet in width, and twelve in depth, which the industrious missionaries had recently cut through the bank of the river, on purpose to lead out the water to irrigate some part of their garden ground, and to drive a corn mill. Into this trench, which was still unfinished and without water, one of the elephants had evidently fallen, for the marks of his feet were

distinctly visible at the bottom, as well as the impress of his huge body on its sides. How he had got in was easy to imagine, but how, being once in, he had ever contrived to get out again, was the marvel. By his own unaided efforts it seemed almost impossible for such an animal to have extricated himself. Could his comrades, then, have assisted him? There appeared little doubt that they had; though by what means, unless by pulling him up with their trunks, it would not be easy to conjecture. And, in corroboration of this suspicion, on examining the spot myself, I found the edges of this trench deeply indented with numerous vestiges, as if the other elephants had stationed themselves on either side, some of them kneeling, others on their feet, and had thus, by their united efforts, hoisted their unlucky brother out of the pit."

The Hippopotamus has a long, large body without hair; short legs, so that the belly almost touches the ground, an enormous head, with a large and very

wide muzzle, a short tail, small eyes and ears, and a stomach divided into several pockets. It lives on roots and other vegetable substances which it finds in



rivers ; is ferocious and stupid, and nothing can exceed the ugliness of its appearance as it walks under the water, where it is dangerous from frequently upsetting boats.

The snout of Hogs enables them to turn up the soil and feed on roots. The Wild Boar is known as the parent stock from whence our infinite variety of domestic hogs has sprung, and is a very formidable animal, not only for its ferocity, but for the mischief which it does in cultivated fields. Domestic hogs are the most prolific of all animals, as they frequently produce a litter of fourteen pigs twice in the year, begin to have young at a year old, and continue to do so till they are twenty. They are brutal by nature, but live in herds, and easily accustom themselves to the subjection imposed on them by man. Their propensity to cry out at the least touch has obtained for them an undeserved reputation for cowardice, for they well know how to defend themselves, and when attacked by wolves, place themselves in a circle, and present their snouts on all sides. It is not possible to exaggerate their gluttony, and they do not even spare their young. There are, however, many instances of a certain degree of affection in them, which, perhaps, with proper treatment, may be elicited from all quadrupeds.

The common species of Rhinoceros has one horn, and very deep folds in the skin ; that of Sumatra has a second horn behind the first, and a smooth skin with scarcely any folds. The species from Africa has two horns, no incisors, and its grinders nearly fill its

jaws. All are large animals, and their horns appear

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as if composed of hairs glued together. They are stupid and ferocious, delight in damp places, and live on grass and branches of trees. There is one in the Zoological Gardens in the Regent's Park which occasionally attempts to be playful, and nothing can be more ludicrous than its efforts.

Tapirs were long supposed to exist only in the New World, where they are the size of a small ass, with a fleshy crest upon their neck, but they have been discovered in the Malaccas and Sumatra. In America, they live in damp spots by the borders of rivers, and their flesh is much esteemed. In the East, they inhabit forests.

The family of Solipeda\* is by far the most interesting of the Pachydermata, as it contains the animal which, next to the dog, is the most serviceable to man, and only yields to him in sagacity. In the jaw is an empty space corresponding with the angle of the

\* One-footed.

mouth, in which the bit of the bridle is always placed. The age of the horse is best known by its incisors ; these begin to appear fifteen days after birth ; at two years and a half, those of the middle are replaced ; at three and a half, the two next undergo the same process, and the two exterior, called the corner teeth, are changed at four years and a half ; at seven years and a half, or eight years, all the hollows are effaced, and the age is marked by the crowns of the incisors becoming more and more triangular. The lower canines appear at three and a half, the upper at four ; they remain pointed till the horse is six years old, and at ten, they begin to grow loose and expose their roots. The Horse rarely lives beyond thirty years : its principal races have sensible differences in the form of the head, and in their proportions, and each is characterised by a preference for different employments. The fleetest and most slender are the Arabian horses, which have aided in perfecting the Spanish race, with which they have contributed to form the English. The largest and strongest come from the coasts of the North Sea, the smallest from Sweden, the Northern Islands, and Corsica. Wild horses generally have a large head, shaggy hair, and are not well proportioned.

The horse is said no longer to exist in a wild state, except where it has regained its freedom after having been domesticated. This is the case in Tartary, in America, and in some parts of Africa, where it lives in herds, conducted and defended by the old males. At three years their training commences, and at four

they are fit for riding. They evince great attachment and memory, in proof of which the author was once recognised by a favourite mare, after an absence of five years, the instant she spoke. Among other human feelings the Horse shares the curiosity of man, and the author used to ride one which never passed an open window which was accessible to her, without putting her head in, and scrutinising what was passing inside, when she would give a slight neigh, and dance away, as if pleased at having gratified her curiosity. Nor is the horse without generosity; for, one belonging to M. Frederic Cuvier being only allowed to eat straw, on account of some temporary malady, his companions, feeding at the same manger, pushed some of their hay to him every time they received a supply, and the same horse was one day detected in pulling hay out of his rack in order to feed a goat in the same stable as himself. He was as fond of sugar as many bipeds are, and when his master was pleased with him, he gave him some; often did the cunning animal play the same tricks over again, and stand still between each, in expectation of the accustomed reward, turning his head round to see if it were coming. M. F. Cuvier generally provided himself with some lumps of sugar when he took the horse out, but if he neglected this, stopped at one of the small inns by the road side, where he procured the reward for his steed, and never again did the latter pass these houses without asking for more.

The proportions of the Dziggetai are between those of the Horse and Ass, and herds of them live in the

sandy deserts of Asia. They are of a grey colour with black mane, and line down the back, and their tail ended with a tuft. The Ass is known by its long ears, tufted tail, and the black cross upon the shoulders, which is the first indication of the stripes of the Zebra. It is originally from the deserts of Asia, where it still lives in numerous herds, and migrates to the south in winter. It will not bear a very cold climate, and even in Europe is much larger and handsomer in the south than the north. It has not always been the despised creature which it now is, and the beautiful breed of St. Jago, in the Cape de Verde Islands (probably from Spain), approaches the "white asses," so often mentioned in Scripture. Its uses, habits, and hard feeding, are too well known to be described here. Its bray is occasioned by two small and peculiar cavities at the bottom of the wind-pipe. The Zebra resembles the Horse, and is beautifully striped with black and white. The Couagga is marked in the same way with brown and white, and receives its name from the barking cry which it utters, and is supposed to resemble that word. The Onagga is like the Ass in form and size, but is striped like the Zebra. All these three last animals come from Southern Africa.

## ORDER VIII. RUMINANTIA.

No incisors in the upper jaw, but instead of these a callous pad.

THE name of the eighth order of Mammalia is derived from a Latin word signifying to "chew over," and the animals which it contains, with the exception of the Camel, appear to have been all constructed on the same model. The incisors of the upper jaw are replaced by a bony pad, and those of the lower amount to eight. Between the incisors and grinders is a space which, in a few genera, only contains one or two canines. There are almost always six grinders everywhere, the crowns of which are marked with double crescents, and the convex part of which, in the upper jaw, is directed inwards. Below, this same part is outwards. The inner edges of the two hoofs are flattened, so that they look like one hoof cleft down the middle, which has given rise to the appellation of forked, or cloven-footed. There are often some small spurs behind the hoofs, which are vestiges of lateral toes. The singular property which Ruminantia possess of chewing their food a second time, by bringing it back into their mouths after first swallowing it, is owing to the structure of their stomachs, of which they have always four. The three first are so disposed that the food enters, at the pleasure of the animal, into either of the three. The first and largest, called the paunch, receives the grass or herbs, which are rudely bruised by the first masti-

cation; thence they pass to the second, called the honeycomb, because the cells of it resemble that structure; this stomach, very small and globular, imbibes and compresses the grass, &c., into little balls, which afterwards reascend successively to the mouth, to be remasticated. The animal reposes during this operation, which continues till all the grass first collected in the paunch has been subjected to it. The aliments, thus chewed a second time, descend immediately into the third stomach, called the feck, the partitions of which are longitudinal plates like the leaves of a book, and from the feck into the fourth stomach, or the reed, the cells of which merely present wrinkles. This last is the true organ of digestion, and answers to the simple stomach of other animals. While the Ruminantia suck and live on milk, the reed is the largest of their stomachs: the paunch develops itself, and assumes its enormous size only in proportion as it receives the grass. The fat of these animals indurates more in growing cold than that of any other quadrupeds, and even becomes brittle; it is called suet. All are very useful to man, and from them he derives most of the flesh by which he is nourished. Several serve him as beasts of burthen, whilst they and others yield him milk, leather, horns, and various productions. The first division into which they are grouped (see TABLE XVII.) bears some lingering affinities to the Pachydermata in their dentition and hoofs.

## TABLE XVII.

## CLASS I. MAMMALIA.

## ORDER VIII. RUMINANTIA.

Division 1. Without horns.

Division 2. With solid horns.

Division 3. With hollow horns.

## Division 1.

GENUS I. CAMELUS. *Camel, Chameaux.*

Canines in each jaw ; two pointed teeth set in the upper incisor bone ; six incisors below ; eighteen or twenty grinders ; bones of the instep (or tarsus) separate ; a small hoof adhering to the last joint of the toes ; lip swelled and cleft ; long neck.

Subgenus 1. CAMELS PROPER. — Two toes united underneath until near the end ; lumps, or one lump, of fat on the back.

2. LAMA. *Auchenia. Peruvian Camel.* — Toes separate ; no lumps on the back.

GENUS II. MOSCHUS. *Musk, Chevrotains.*

One long canine on each side of the upper jaw ; the only animal in the order possessing the small bone of the leg.

## Division 2.

GENUS I. CERVUS. *Deer, Cerf.*

Branching horns, like a thick bone in substance, and deciduous (falling off) ; lachrymals, or folds of skin under the eye for the passage of tears, with a corresponding hole in the skull.

Section 1. Horns presenting more or less of a flat surface.

Section 2. Horns round.

Section 3. Horns small in proportion.



GENUS II. CAMELOPARDALIS. *Cameleopard, Giraffe.*

Both sexes with conical horns, covered with skin, which never fall; a tubercle between the two; fore legs disproportionally long; lachrymals.

## Division 3.

## GENUS I. ANTELOPE.

## Lachrymals.

- Section 1. Horns with rings curved twice, pointed forwards, backwards, or upwards.
- Section 2. Horns curved thrice.
- Section 3. Horns curved twice, and their tips directed backwards.
- Section 4. Small straight horns, or very little curved, less than the head.
- Section 5. (Reduncæ of Smith.) Horns with a simple curve, pointing forwards.
- Section 6. (Oryx of Smith.) Horns straight or little curved, longer than the head.
- Section 7. (Aigoceros of Smith.) Horns with a simple curve, pointing backwards.
- Section 8. Horns with a spiral ridge.
- Section 9. (Antilocapræ of Ord, Dicranoceros of Smith.) Forked horns.
- Section 10. (Tetraceræ of Leach.) Four horns.
- Section 11. Two smooth horns.

Subgenus 1. CATOBLEPAS. *Gnu, Niu.* — Body and crupper of a small Horse, covered with brown hair; tail furnished with long white hair like that of a Horse; an upright mane, white at the base, black at the top; horns near together, and enlarged at the base, descending outwards and turning up again at the point; muzzle wide, flattened, and encircled by projecting horns; a second mane, black in colour, under the throat.

GENUS II. CAPRA. *Goat, Chèvres.*

Horns directed upwards, and inclined backwards ; chin generally furnished with a long beard ; forehead generally concave.

GENUS III. OVIS. *Sheep, Moutons.*

Horns directed backwards, and returning to the front in a spiral form ; forehead generally convex.

GENUS IV. BOS. *Ox, Bœuf.*

Horns directed towards the side, and returning upwards, or forwards in the form of crescents.

Their full and cleft upper lip, their long neck, the projecting sockets of their eyes, the feebleness of the hinder part of their body, the unsightly proportion of their feet and legs, make Camels appear like deformed creatures ; but their spare eating, and the length of time which they can go without drinking, make them most valuable to the traveller ; the latter faculty is probably owing to the number of cells with which the sides of the paunch are filled, and which retain, or constantly produce water. The Camel with two humps is originally from the centre of Asia, and does not descend as far to the south as the Camel with one hump, which is spread from Arabia throughout the north of Africa, and a great part of Syria, Persia, &c. The Camel with two humps lives better in humid places, and is larger and stronger than the other ; but the Camel with one hump carries its abstinence furthest. The Dromedary is a lighter and swifter variety of the latter, and better adapted for riding. The flesh and hair of all serve for food and clothing, and both spe-

cies are useless on stony ground. Their pace is extremely fatiguing to those who are not accustomed to it; and if mounted when kneeling down, the uninitiated must be careful to avoid a blow from the high saddles which are generally placed upon their backs. They raise the hind legs first, which throws the rider forwards; and then, as they get upon their fore legs, he is with equal violence thrown backwards. The manner in which they cross the plains of Asia and Africa is well known, together with their name of "The Ship of the Desert;" a fitting appellation when applied to a conveyance over those oceans of sand. They are extremely docile; but, when excited, bite furiously.

Llamas are the camels of the New World; but are of much smaller size, and are more agreeable in form. They were the only beasts of burthen in Peru when it was discovered; and, although not larger than a deer, will carry 150 pounds weight.

The canines of the male Musks extend beyond the mouth; they are light, elegant-looking animals, the size of a goat, and are covered with hair resembling prickles. The male of the *Moschus moschiferus* has a pocket, in which most of the musk used by perfumers is secreted. It comes from that rocky region which lies between Siberia, China, and Thibet.

The horns of other Ruminantia assume different shapes and coverings. The Deer have them encased in a skin like that of the head, but there is a ring of bony tubercles at the base which, as they increase, intercepts the vessels which nourish the skin; it then

dries, falls off, and the bones, being naked, begin to separate from the skull, and fall in their turn. New ones, however, soon shoot forth, which are generally larger than the preceding, and destined to undergo the same process. The horns of Deer are called wood, and the females have none, except those of the Rein-deer. All are very swift in their course. The horns of the Elk, Rein-deer, and Dama, are wholly or partially flattened, and those of the former sometimes weigh from fifty to sixty pounds, having four antlers or branches on each horn. The valuable services of the Rein-deer are well known; their legs are shorter than those of other species, and to the inhabitants of the north of Europe they serve as horses, and their flesh and milk form essential articles of food. The species belonging to Section 2. are generally spotted in the most beautiful manner. The horns of Section 3. resemble a dagger. Giraffes of both sexes possess horns, and the tubercle or third horn is wider and much shorter than the others. Their remarkably long neck, and the great disproportion between their fore and hind legs would make them very unsightly animals, were it not for their beautiful head, and glossy skin covered with triangular, fawn-coloured spots. They rise to a height of eighteen feet, and feed on the leaves of trees. They were known in Europe in the time of the Romans and middle ages. They were then lost sight of, and some discredit was thrown upon travellers who reported their existence. The first living Giraffes brought to Europe in modern times were those which came to

England and France from Nubia and Darfûr. The former soon died, and has since been replaced by others, now in the Zoological Gardens of London. The entrance of the latter into France resembled a triumphal march through the country; for not only did the populace greet her from motives of curiosity, but the authorities of the towns came in procession to meet her, and a learned savant was despatched from Paris to escort her to the capital. On one occasion, however, she broke loose; and, being but little sensible to the dignity of her position, scampered and frolicked about with the greatest delight, thereby causing more than one grave gentleman to roll from his steed. Once arrived in Paris, crowds pressed so eagerly to see her, that thirteen thousand persons more than the usual number passed weekly over the Pont d'Austerlitz, and this was only one approach to the Jardin du Roi, where she was lodged. For six weeks there was no abatement in the public curiosity, and precautions were obliged to be taken to prevent the multitude from pressing upon her. When towering her head above those who were thus assembled, if she espied a turban (and at that time there were several natives of the East in the French capital), she licked the fore-

head of the wearer, which she never offered to do to those with or without hats. Her eagerness for roses was very great, and she constantly snatched them from those who wore them, often to their astonishment, as few could calculate the distance which her long neck enabled her to attain. Her keeper, who was from Darfûr, slept in a gallery erected for him at the top of the stable which she occupied, and in the morning when she awoke, if she did not hear him stirring, she would rouse him with her nose. Fans, ribbons, and even dresses, bore either her likeness or her colour, and nothing ever created a greater interest in Paris, from the throne to the hovel, than "La Girafe."

The hollow-horned Ruminantia form by far the most numerous division of the order, and among them Antelopes bear an immense proportion. The name is a corruption of the word Antholophos, mentioned by a writer in the time of Constantine. Section 1. contains the Gazelle, or Gazel of the Arabs, so celebrated in Eastern poetry for its grace and gentleness, and for the beauty of its full, dark eye. It is the favourite prey of the lion and the panther; and when its numerous herds are attacked, they form themselves into a circle, and present their horns on every side. To the same section also belong the Springbucks of South Africa, where Mr. Pringle says, "They literally speckled the face of the country as far as the eye could reach, insomuch that we calculated we had sometimes within view not less than 20,000 of these beautiful animals. As we galloped

on, they bounded off continually on either side, with the light and sportive velocity from which they derive their colonial appellation. They were probably part of one of the great migratory swarms which, after long-continued droughts, sometimes inundate the colony from the northern wastes.

In Section 3. is the *Bubalus* of the ancients, or the Barbary Cow. Section 4. contains that exquisite little creature the *Antilopus pygmæa* with its fairy legs, but little bigger than the stem of a tobacco-pipe, and standing no higher than a domestic cat. Many efforts have been made to bring them alive to England, but they have hitherto failed. The late Captain Fisher of the Navy succeeded in taking two as far as the Channel, where they died from eating some pieces of cork which had been dropped upon the cabin floor, and which was the more mortifying, as he had given up all the goat's milk provided for his use to their sustenance. The *Oryx* of the ancients (*Antilope leucoryx*), so often represented on the Egyptian and Nubian monuments, is in Section 6.; also the Cape Chamois, as large as a stag, and supposed, when it had lost one horn, to have given rise to the fable of the Unicorn. The Chamois of Europe is the only one of the Ruminantia of that continent which may be compared to the Antelopes. The points of its otherwise straight horns suddenly turn back like a fish-hook. The subgenus *Catoblepas*\* is founded upon the Gnu, and is supposed to be the

\* From two Greek words, signifying to look down.

animal so designated by the ancients from the position of its head, which obliges it always to look towards the ground. Mr. Pringle states that they are said to be strongly affected if a red flag be exhibited to them. They have been frequently tamed when young, but are mischievous and savage when old.

The three last genera of Ruminantia have the bony part of their horns divided into cells, which communicate with the skull.

The wild Goat, from which all the domestic varieties are supposed to have sprung, lives in flocks on the mountains of Persia, and perhaps several other countries, even the Alps. The bezoar stone of the East, formerly thought to be of so much efficacy as a medicine, is a concretion found in its intestines, and consists of a resinous substance, magnesia, &c. The number and size of goats' horns vary to infinity. The Angora and Cappadocian species are celebrated for their fine silky hair, in which, however, they are far exceeded by those of Thibet, from which the Cachemire shawls are manufactured. They are all hardy, wandering animals.

There are several races or wild species of the genus *Ovis*, all bearing great affinity to each other, and varying in size. The Mouflon of America is supposed to be a species of *Argali*, which has passed the sea upon the ice. It exists also in Corsica, Barbary, and Egypt, and from it the innumerable races of woolly animals have been derived. The Spanish varieties have the finest wool; then come those of England. The Russian varieties have a long tail:



those of India and Guinea have long legs, hanging ears, no horns, and their fleece more resembles hair than wool. The Persian, Tartarian, and Chinese races have the tail transformed into a double globe of fat.

Oxen are, generally speaking, large animals, with wide muzzles, clumsy body, and strong legs. The common Ox has a flat forehead, and the size of the horns varies much. The species of the Torrid Zone have a hump of fat upon their shoulders, and are scarcely bigger than a hog. The Aurochs or Bison is distinguished by a convex forehead, by its horns being placed low upon the skull, by the height of its legs, by an additional pair of ribs, by a curly mane over the neck and head of the male, forming a beard under the throat, and by a grunting voice. It is the largest of European quadrupeds, is extremely savage, and lives in marshy forests. The Buffalo is originally from India and Africa, and is very difficult to domesticate. It possesses great strength, and will eat herbage that is too coarse for the Ox. Its milk is good, and its leather very strong. The hump on its shoulders is the only part of its flesh which is esteemed as good eating. The natives of Western Africa say, that if the foremost of a herd be attacked on its march, all those that follow will retaliate; if one in the middle be selected, all those before go on, and those behind turn upon the enemy; and if the last be injured, all the rest pass on without heeding the blow. Mr. Pringle relates the following adventure: —“A party had gone to hunt a herd of buffaloes

which were grazing on a piece of marshy ground. As they could not conveniently get within shot of the game without crossing part of the marsh, which did not afford a safe passage for horses, they agreed to leave their steeds in charge of their Hottentots, and to advance on foot, thinking that if any of the buffaloes should turn upon them, it would be easy to escape by retreating across the quagmire, which, though passable for man, would not support the weight of a heavy quadruped. They advanced accordingly, and under covert of the bushes approached the game with such advantage, that the first volley brought down three of the fattest of the herd, and so severely wounded the great bull leader, that he dropped on his knees bellowing furiously. Thinking him mortally wounded, the foremost of the huntsmen issued from the covert, and began reloading his musket as he advanced to give him a finishing shot. But no sooner did the infuriated animal see his foe in front of him, than he sprang up, and rushed headlong upon him. The man, throwing down his heavy gun, fled towards the quagmire; but the beast was so close upon him that he despaired of escaping in that direction, and turning suddenly round a clump of copsewood, began to climb an old Mimosa tree which stood at one side of it. The raging beast, however, was too quick for him. Bounding forward with a roar which my informant described as being one of the most frightful sounds he ever heard, he caught the unfortunate man with his terrible horns just as he had nearly escaped his reach, and tossed

him into the air with such force that the body fell, dreadfully mangled, into a cleft of the tree. The buffalo ran round the tree once or twice, apparently looking for the man, until weakened by loss of blood he again sank on his knees. The rest of the party, recovering from their confusion, then came up and despatched him, though too late to save their comrade, whose body was hanging in the tree quite dead."

That singular animal the Yak, or Grunting Cow of Tartary, is a small species, the tail of which is covered with long fine hair; it has also a mane on the back, and is from the mountains of Thibet. The standards used by the Turks to distinguish their superior officers were formerly made of the tail of the Yak.

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## ORDER IX. CETACEA.\*

No hind feet; tail thick and ending in a horizontal cartilaginous fin; neck thick and short; fore limbs like fins.

CETACEA are without hind feet, and have an elongated body, ending in a cartilaginous, horizontal fin. Their head is joined to their body by so short and thick a neck, that there is no visible difference in the size of this part, and the vertebræ which compose it are very small, and partly soldered together. The

\* From *Cete*, Whales.

bones of their fore-feet are flattened, and enveloped in such a manner by skin as to resemble fins. Their whole outward appearance is like that of fishes, and they mostly live in water; but as they breathe through lungs, they are obliged to come frequently to the surface for air. However, their warm blood, their ears opening externally, although by very small holes, their viviparous young, the teats by which they suck, and many of their anatomical details, decidedly separate them from fishes. Their brain is large, they have no hair upon their body; and they are obliged, in consequence of the form of their tail, to bend themselves from above to below, in order to move through the water. The teeth of the first family show the vegetable nature of their food, and they come ashore to graze. The fables concerning Sirens, &c. are probably founded upon the appearance which they make when upright in the water. Their nostrils are pierced through the skin at the end of the muzzle, but in the skull they are much higher up. Their stomach is divided into four pockets. (See TABLE XVIII.)

## TABLE XVIII.

## CLASS I. MAMMALIA.

## ORDER IX. CETACEA.

Family 1. HERBIVOROUS CETACEA. — Teeth with flat crowns; teats on the breast; hairy whiskers.

**Family 2. CETACEA PROPER.**—Teeth conical or none; teats under the belly; smooth skin, no hair; blowers, vents, or spiraculæ.

**FAMILY I. HERBIVOROUS CETACEA.**

**GENUS I. MANATUS.** *Sea Cow, Lamantin, Manates.*

Body oblong, terminated by a long, oval fin; eight square grinders every where; no incisors, no canines, except when very young, when there are two very small pointed teeth, which quickly fall; vestiges of nails on the edges of the fins.

**GENUS II. DUGONG.** *Halicore.*

Grinders as if composed of two cones united at the sides; pointed tusks, in a great measure covered with thick, fleshy lips; five in the form of a crescent.

**GENUS III. STELLERA.** *Rytinæ, Stellères.*

One grinder on each side; no nails to the fins.

**FAMILY II. CETACEA PROPER.**

**GENUS I. DELPHINUS.** *Dolphin, Dauphin.*

Simple conical teeth in each jaw.

**Subgenus 1. DELPHINUS PROPER.**—Forehead swelled; muzzle forming a beak.

2. **DELPHINORHYNCHUS.**—Muzzle very long and slender.

3. **PHOCÆNA.** *Marsouins.*—No beak; muzzle short and swelled.

4. **DELPHINAPTERA.**—No dorsal fin.

5. **HYPEROODON.**—Muzzle resembling *Delphinus Proper*; only two small teeth, not always visible, before the lower grinder, and palate armed with small tubercles.

GENUS II. MONODON. *Narvals*.

No teeth, properly speaking, but one long, straight, pointed tusk, placed in the palate, and the germ of another.

GENUS III. PHYSETER. *Spermaceti Whale, Cachalots*.

Very voluminous head, enlarged in the fore part; upper jaw teeth very small or none; lower jaw with a row of conical, cylindrical teeth.

Subgenus 1. PHYSETERA. — A dorsal fin.

GENUS IV. BALÆNA. *Whale, Baleines*.

Large head, no teeth; upper jaw like a reversed keel, each side furnished with thin, close transversal plates called whiskers; tongue fleshy and very thick.

Subgenus 1. BALENOPTEBA. — Belly smooth; fin on the back.

2. ROBQUAL. — Belly wrinkled.

The small nails of the Manatus assist them in crawling and carrying their young, which has caused their fore-legs to be compared to hands, and the animals themselves to be styled Manatus.\* They are also frequently named Marine Women and Marine Cows. They are found near the mouths of rivers, in the warm latitudes of each hemisphere. Their flesh is eaten, and they constantly attain a size of fifteen feet. The Dugongs inhabit the East Indian shores. The Stelleræ are natives of the Pacific; and their stomach is more simple than that of the preceding genera.

The Cetacea Proper are distinguished by that singular apparatus to which they owe their common

\* From *manus*, a hand.

name of blowers, or spouters. Along with their prey they swallow a large quantity of water, which passes back again through the nostrils, and is collected into a bag placed at the external orifice of the cavity of the nose, whence it is expelled by the pressure of powerful muscles through a very narrow opening, pierced in the top of the head, and called the vent. The nerves which convey the sense of smell are often wanting, and, owing to the quantity of water which is always passing through the nose, none of them can possess a large share of this faculty. Their voice is reduced to simple murmurings; they have a smooth skin all over their body, under which lies that thick lard which yields oil, and is the object for which they are so much sought. Their stomach is divided into five, and even seven, pockets; but they never masticate their food. They have only vestiges of hinder extremities, consisting of two small bones suspended in the flesh. Several have an upright fin upon the back, which, however, is not supported by bones.

The common species of Dolphin has from forty-two to forty-seven teeth; they are at least ten feet long, and the formation of their brain shows that they are capable of much which is attributed to them in ancient fables. Various species are found in the Mediterranean, Atlantic, and Indian seas.

The Porpoise is the common species of *Phocæna*, and is to be found in almost every part of the sea. To this subgenus also belongs the Grampus, which often measures from twenty to twenty-five feet, and is the greatest enemy which the whale possesses; for

it attacks the latter in numbers, in the boldest manner, teases it till it opens its mouth, and then devours its tongue. The author once saw a combat between these two animals, where each, apparently struggling with the other, rose almost upright from the water, and then plunged in again, causing a commotion, and tinging it with blood for a large space. The skull, as well as muzzle, of the Hyperoodons resemble those of the Dolphin, but they are often called Whales with beaks.

The head and body of the Monodons resemble those of the *Phocænæ*: the only species generally has the one long, straight, pointed tusk, grooved in a spiral fashion, sometimes measuring ten feet, and which, when found separate from the animal, has been often called the Horn of the Unicorn. A vestige of the other tusk is on the right side, and almost always remains hidden in the socket for life.

The heads of the other Cetacea are so enormous that they occupy one third, or half the whole length, of the animal. That of the *Physeter* is every where enlarged; their lower jaw is long and narrow, and lodges in a furrow of that above, and its teeth fit into corresponding cavities when the mouth is closed. The upper part of the head consists of large cavities, covered and separated by cartilage, and filled with oil, which coagulates when cold, and is the spermaceti of commerce. The true skull lies under these cavities. Their spermaceti is distributed over several parts of the body, communicating with the cavities of the head, and lying between the layers of lard or



blubber, which with them is not very thick. The sweet-smelling substance called ambergris is a concretion formed in the intestines of these animals, especially when in some degree diseased. The species are not well determined; and in one the vent is said to be towards the left side of the head, and the left eye smaller than the other. They have no dorsal fin, and are distributed through various seas.

Although large, the head of Whales does not attain the size of that of the *Physeter*. Its whiskers appear like fibrous bone, unravelled at the ends, and form the whalebone of commerce. They serve to retain the small animals on which Whales feed; while the water taken with them into the mouth passes through. Their tongue entirely envelopes the inside of the upper jaw and horny plates when the mouth is closed. The *Balæna* Proper scarcely ever exceeds seventy feet in length, and has no dorsal fin. Their lard is sometimes several feet thick; and for this and the whalebone are the whale fisheries carried on. The Northern Seas have been so thinned of these animals that the fishing is now transferred principally to the Southern Seas. Each individual whale will have from eight to nine hundred plates of bone on each side, and will yield one hundred and twenty tons of oil. Mollusca attach themselves to its skin, and often give it a rocky appearance. The *Balænoptera* are more slender in form than the common Whale, yield but little oil, and are very ferocious. The numerous wrinkles in the skin of the Rorqual allow it to dilate, but for what purpose has not been ascertained.

## CLASS II. AVES.

BIRDS are oviparous animals, adapted for flight, and endowed with double breathing and circulation. Their lungs are fixed against their ribs\*, and are enveloped in a membrane pierced with large holes, through which the air passes into several cavities in the breast, the belly, under the wings, inside the bones, and even the stems of the feathers and the beak; so that it reaches not only the lungs, but a great number of vessels distributed over the body; all of which is called double circulation and respiration, and gives them a proportionable increase of energy. Their blood is also very red from this contact with so much air. Those extremities which answer to the fore legs of quadrupeds, or wings, are the organs of flight, and can neither serve them for walking, standing, or grasping; they are, therefore, bipeds, and take objects from the ground with their mouth. Their body is much inclined forwards, their thighs advance, and their toes are much elongated, in order to form a sufficient base for the body to rest upon. A peculiar set of muscles, reaching from the pelvis to the toes, and passing by the knee and heel, bends the toes by the simple weight of the body, and enables them to

\* The lungs of Mammalia are free and divided, and the diaphragm, or membrane, which separates the cavity of their breast from that of the belly, does not exist in birds. An idea of the nature of a membrane may be formed from those bladders which are used for covering the tops of jars, &c.

sleep perched upon one foot. The pelvis is prolonged and widened in order to give room for the eggs. The neck and beak are long, the former containing numerous vertebrae, which enable it to reach the ground, and to turn over the back when the bird is stationary. The whole of the body is calculated to give strength and solidity to the wings; the breast bone or sternum, to which the muscles employed in flight are attached, is very large, and further augmented by a projecting ridge in the middle formed like a keel. The merrythought produced by the union of the two collar bones, with other developments of bone, keep the shoulders apart when the bird is flying. The wing, supported by bones analogous to the upper arm, fore-arm, and hand of mammalia, is furnished with one finger and the vestiges of two others, and bears a row of elastic pen feathers in its whole length

(6), which extend the surface exposed to the air.

The pens which adhere to the hand are called primary feathers (4), and amount to ten; those which belong to the fore-arms are named secondary (5), and vary in number; the smaller feathers attached to the upper arm are termed scapulary (3); the bone which represents the thumb is furnished with feathers called bastards (2); and at the base of the pens is a row called coverings. The bony tail is very short, but it also bears a row of strong feathers, varying in number from twelve to eighteen, which, by spreading, help to support the bird. In the legs is an elastic ligament, by means of which the extension of these members is maintained without the help of muscles. The tarsus and metatarsus, which represent the instep and foot of mammalia, and the former of which is much elongated in birds, are each formed of a single bone. There are mostly three toes in front, and a great toe; but the latter is sometimes wanting. The number of joints increases with every toe, beginning at the great toe \*, which has two, and ending with the last, which has five. Birds are generally covered with feathers, which admirably adapt them to the rapid variations of temperature to which they are exposed during flight; and that portion of the ribs which joins to the sternum is formed of bone instead of cartilage, and consequently gives additional force to the dilatation of their breast. Their eyes are so formed as to distinguish near and distant objects equally well. The outer face of the globe

\* The number of joints in the toes of Mammalia is the same in each.

or ball is strengthened by a circle of bony pieces; and, besides the usual eyelids, a third is placed at the inner angle of the eye, and covers it like a curtain. This is called the nictitating\* membrane, and defends the eye when the bird is flying in the face of the sun, without obstructing its sight; or protects the eye of those which dive, when they are under water. The opening of the ear is generally covered with fine feathers; but nocturnal birds alone have the external couch. The organ of smell, hid in the base of the beak, is very acute, and the width of the bony openings of the nostrils greatly determines the form of the beak. The cartilages, membranes, feathers, and other coverings which narrow these openings, influence the strength of smell and kind of nourishment. The feathers are composed of a stem, hollow at the base, and beards which bear others still smaller: their texture, their brilliancy, their strength, their general form, vary to infinity. They fall twice every year, and, in certain species, the winter plumage differs from that of the summer. That of the female is generally duller than that of the male; and the young of both sexes mostly resemble the mother. When male and female adults are of the same colour, the young have a plumage peculiar to themselves.

Covered as they are with feathers, scales, or callous skin, and having a horny beak, the touch of birds cannot be very sensible. Their brain is larger in proportion

\* From *nicto*, to wink; already mentioned in Bears.

than that of other animals, even surpassing that of mammalia in its relative size. The trachea, or windpipe, has rings all round, and where it divides into two branches, there is a bag or box \* in which the voice is formed; the air cavities, before mentioned, contribute to its force, and the various forms and movements of the windpipe to its modifications. The horny substance of the beak supplies the place of teeth, and is sometimes prickled in such a manner as to represent the latter, or its edge descends in the shape of a tooth on each side. The form of this beak varies to infinity, and is adapted to the food of the bird. The stomach is composed of three parts: the crop, which is an enlargement of the gullet, the succenturium, or membranous stomach, the cells of which contain a multitude of glands which supply the food with juices; and the gizzard, armed with two strong muscles united by two tendons †, and covered inside with a velvet-like cartilage. The food is ground by these; which operation is often assisted by small stones swallowed by birds for that purpose. This gizzard is much weaker in those birds which live on flesh or fish, and frequently seems to form but

\* This is called the larynx; that of man is a bony box at the *top* of the windpipe, in which are two chords, and the opening and shutting of the valve at the windpipe causes vibrations upon those chords, and gives modulation to the voice.

† Tendons are of fibrous texture, but the fibres in them are close together, firm, and of a silvery white; fewer vessels go to them, and no nerves; they have, therefore, no sensibility, and are but a passive link by which the muscles act.

one bag with the second stomach. The heat required for hatching eggs is, in most instances, supplied by the birds themselves, and the heat of their body is increased at the time of sitting. As the young one grows within the shell, it absorbs that part which is commonly called the white; and at the moment of hatching, the yolk is supposed to enter into the belly of the young bird, which breaks the shell for itself with the horny tip of its beak. Every one knows the industry and skill which birds exercise in the construction of their nests, which, however, vary, even in birds of the same species. The tender care which most of them take of their young is proverbial; the exceptions to it being reckoned a marked feature in their economy or habits. Their rapid passage through the different regions of the atmosphere, and the constant action of this element upon them, afford them the means of presaging variations of weather, of which we have no idea; which circumstance has, from the earliest times, induced superstition to attribute to birds the power of announcing the future. Birds have memory, and even imagination, for they dream; and every one knows with what facility they are tamed, allow themselves to be trained to different services, and retain airs and words. Their emigrations have long excited the attention of naturalists; and it would seem that, under all circumstances, they feel a periodical necessity for changing their abode; for at times, even when they have been brought up in cages and warm rooms, where they can know but little of the changes of the outward

temperature, or of the food, in search of which they often migrate, they become restless and uneasy, and evidently desirous of flight. The epochs at which this takes place vary according to the species and age, the young commencing their journeys after the adults, as they are less strong than their parents after moulting \*, and consequently less able to bear fatigue. The return of birds to the same nest, or to the same spot, which they have inhabited for years, is a strong proof of their memory.

The classification of birds depends on their beak, feet, &c. (See TABLE XIX.)

## TABLE XIX.

### CLASS II. AVES. *Birds.*

#### ORDER I. ACCIPITRES. *Birds of Prey, Oiseaux de Proie.*

Beak and talons crook'd; nostrils pierced in a membrane which envelopes the base of the beak; three toes before, one behind, all bearing strong nails; generally a membrane between the two external toes.

#### ORDER II. PASSERES. *Passereaux.*

Two external toes united at the base, and sometimes in a part of their length; all such birds as cannot be classed in the other orders.

#### ORDER III. SCANSORES. *Climbers, Grimpeurs.*

External toe turning back like the great toe.

\* The changing of the feathers.



ORDER IV. GALLINACEÆ. *Gallinæ*.

Arched upper mandible ; nostrils partially covered by a soft, cartilaginous scale ; toes generally having a dentated membrane along the edge.

ORDER V. GRALLÆ. *Shore-birds, Échassiers*.

Naked thighs ; feet partially palmated.

## ORDER VI. PALMIPEDES.

Toes entirely united by membranes ; neck exceeding the length of the legs ; legs fixed in the hind part of the body.

The crook'd beak and nails of birds of prey make them formidable enemies to other birds, small quadrupeds, and reptiles, and aid in establishing them as the Carnivora of the class. The muscles of their thighs and legs are particularly strong, and give force to their claws ; their plumage is close, their pen feathers strong, and their flight powerful. (See TABLE XX.)

## TABLE XX

## CLASS II. AVES.

## ORDER I. ACCIPITRES.

- Family 1. DIURNÆ. — Birds which feed by day.  
2. NOCTURNÆ. — Birds which feed by night.

## FAMILY I. DIURNÆ.

GENUS I. VULTUR. *Vulture, Vautours*.

Eyes even with the head ; tarsi reticulated (covered with small scales like network) ; beak long, curved towards the end ; part of the head and neck bare.

- Subgenus 1. **VULTUR PROPER.** — Strong and thick beak ; nostrils across the base ; head and neck destitute of feathers ; a collar of long feathers, or down, at the bottom of the neck.
2. **SARCORAMPHUS.** — Caruncles (or fleshy appendages) at the base of the beak ; nostrils oval and longitudinal.
3. **CATHARTES.** *Gallinazes, Catharistes.* — No caruncles ; nostrils of the Sarcoramphi.
4. **PERCNOPTERA.** *Gypaetos, Néophron.* — Beak slender, long ; a little swelled above the curves ; oval and longitudinal nostrils ; only the head without feathers.

## GENUS II. GYPAETOS. *Griffons, Phène.*

Eyes even with the head ; head entirely covered with feathers ; very strong, straight beak, crook'd at the end, swelled above the curve ; nostrils covered by stiff bristles ; a tuft of the same under the beak ; tarsi short and covered with feathers to the toes ; wings long, the third pen the longest of all.

## GENUS III. FALCO. *Falcon, Faucon.*

Head and neck covered with feathers ; projecting eyebrows.

### Division 1. NOBILES. *Noble Birds of Prey.*

Beak curved from the base, with a sharp tooth on each side of the point ; the second pen of their wings the longest.

Subgenus 1. **FALCO PROPER.** — See the characters of the Division.

2. **HIEROFALCO.** *Gerfaults.* — Beak having only a festoon instead of a tooth ; tail longer than their wings ; tarsi short, furnished with feathers in the upper half.

Division 2. **IGNOBILES.** *Ignoble Birds of Prey.*

Not employed in falconry ; the fourth pen the longest of their wings ; the first very short ; a slight festoon in the middle of the beak.

Tribe 1. **AQUILA.** *Eagle, Aigles.* — A very strong beak, straight at the base, curved at the point.

Subgenus 1. **AQUILA PROPER.** — Tarsi feathered to the toes ; wings and tail of equal length.

2. **HALIÆTUS.** *Fishing Hawks, Aigles Pêcheurs.* — Tarsi feathered half way down, half of them plated (or having large flat scales) ; same wings as the preceding.

3. **PANDION.** *Balbusards.* — Beak and feet of the *Haliætus*, but claws round underneath, instead of grooved ; tarsi reticulated ; second pen of the wing the longest.

4. **CIRCAETUS.** — Wings of Eagles ; tarsi of *Pandions*.

5. **CARACARA.** — Tarsi naked, plated ; a part of the sides of the head, and sometimes the neck, bare ; long wings.

6. **HARPYA.** *Short-winged Fishing Eagles.* — Very thick, reticulated tarsi, half covered with feathers ; wings short.

7. **MORPHNUS.** *Aigles Autours.* — Wings shorter than the tail ; tarsi high and slender ; toes feeble.

8. **CYMINDIS.** — Nostrils almost closed like a crack.

Tribe 2. **ASTUR.** *Dædelion, Autours.* — Wings shorter than the tail ; beak curved from the base.

Subgenus 1. **ASTUR PROPER.** — Tarsi plated and short.

2. Some American species with reticulated tarsi.

Tribe 3. **MILVUS.** *Hawk, Milans.* — Short tarsi; toes and claws feeble; beak small; wings excessively long; tail forked.

Subgenus 1. **ELANUS.** — Short, reticulated tarsi, half covered with feathers.

2. **HAWKS PROPER.** — Tarsi plated and stronger.

3. **PERVIS.** *Bondrées.* — Space between the eyes and beak covered with close, scaly feathers; tarsi half feathered and reticulated; tail equal; wings long, and curved from the base.

4. **BUTEO.** *Buses.* — Wings, tail, and beak of the preceding; space between the eyes and beak bare.

5. **CIRCUS.** *Busards.* — Tarsi longer than those of the Buteo; a collar on each side of the neck, formed by the ends of the feathers which cover the ears.

6. **SERPENTARIUS.** *Gypogeranus, Secretary Bird, Messenger, Secrétaire.* — Tarsi double the length of the preceding subgenera; plated; a naked space round the eye; a stiff crest at the back of the head.

## ORDER I. ACCIPITRES.

### FAMILY I, DIURNÆ.

Eyes directed towards the side; a membrane, called *cera*, at the base of the beak in which the nostrils are pierced; three toes before, one behind.

THE eyes of the Diurnæ look sideways; and the membrane which covers the base of the beak, and in

which the nostrils are pierced, is called Cera. They have three toes before, and one behind, and the two on the outside are always united at their base by a short membrane; their sternum is large, and their semicircular merrythought is of such a shape as to resist the violent action of the wings in their rapid flight.

The strength of the Vultures talons does not correspond with their size, and they use their beak in seizing their prey. Their wings are so long that, when they walk, they are obliged to keep them half extended. They are cowardly birds, feed on carrion, rather than living prey; and, after having gorged themselves, sink into a state of stupidity. Mr. Waterton's evidence seems fully to have established the fact that their smell is very acute; that they scent their prey from a great distance in the air, and that they do not associate in numbers; the contrary having been asserted by M. Audubon.

Vultures Proper are only found in the Old World. Among the Sarcoramphi is the king of the vultures, the naked parts of whose neck are coloured with a variety of brilliant hues. Their caruncles are dentated like those of the Cock. The Condor also belongs to this subgenus; the male bird of which has a crest under, as well as upon, his beak. It lives at a greater height than any other bird, and inhabits the Andes,

immediately below the region of eternal snow. It measures more than four yards from the tip of one wing to that of the other. When several are assembled together, they are said to be able to kill oxen. The natives have a peculiar shout, which always causes these birds to extend their wings.

The Brown Vultures of Western Africa will probably prove that some of the *Sarcoramphi*, hitherto supposed to belong only to America, exist in that country. The author has seen them after a meal in so stupid a state as to allow her to push them from the cannons, on which they had perched themselves, without offering any resistance.

The *Percnoptera* were sacred among the Egyptians, and often represented on their monuments. The *Gypaetos* is the largest bird of prey in the Old World, and has all the characters of vultures besides its own peculiarities. It nests in steep rocks, attacks lambs, goats, chamois, &c., and is said not only to carry away children, but to molest men while asleep: it is nearly four feet high, and measures nine to ten feet from tip to tip.\*

The *Nobiles* are much more courageous than other birds in proportion to their size. From the shape of their wings, they are obliged to fly obliquely when the atmosphere is calm, and when they wish to rise in a straight line, they are forced to fly against the wind. They are extremely docile, and most serviceable in the art of falconry, being taught to pursue

\* This means from the tip of one wing to that of the other.

game, and return when called. They never feed upon dead prey, and pursue birds at full speed, or fall perpendicularly upon them. The female is generally one third larger than the male.

The Ignobiles are much more numerous than the above, and among them are the most powerful of all the birds of prey. Eagles live on high rocks and mountains; their flight is high and rapid; they pursue other birds and quadrupeds; their courage equals their size and strength; and they inhabit almost all the mountainous parts of the world. The Imperial Eagle is that celebrated by the ancients.

The Milvus is a very cowardly bird, although it causes such alarm to its smaller brethren. One of the most interesting of the whole division is the

Serpentarius, which inhabits the open and arid country behind the Cape, where it pursues reptiles, for which qualification the French introduced it into their West Indian islands. The name of Secretary

Bird is a fanciful appellation. Mr. Pringle says of it, that it is a peculiar blessing to the natives of South Africa; for they are indebted to him for the destruction of a vast quantity of insects and reptiles, whose multiplication, without some such means, would be a formidable calamity. These birds always kill their prey before swallowing it. Whether the Secretary meet with a serpent or a tortoise, he invariably crushes it under the sole of his foot; and such is the skill and force with which he gives the blow, that it is very rare for a serpent of an inch or more to survive the first stroke. When he meets with a serpent that is large enough to oppose a long resistance to him, he flies off, with his prey in his beak, to a great height, and then dropping it, follows it in its descent with great rapidity, so as to be ready to strike it when it falls stunned to the ground. In general, these birds are easily domesticated.

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## FAMILY II. NOCTURNÆ.

Head large; eyes large and directed forwards; cera on the beak.

Nocturnal birds of prey (see TABLE XXI.) have a large head, large eyes looking forwards, and encircled by a disk of five feathers, the foremost of which cover the cera, and the hindmost the ears.



## TABLE XXI.

## CLASS II. AVES.

## ORDER I. ACCIPITRES.

## FAMILY II. NOCTURNÆ.

GENUS I. STRIX. *Owl*.

Orifice of the ear large ; a large circle of fine feathers round the eyes ; small collar of scaly feathers.

Subgenus 1. OTUS. *Owl, Hiboux*. — Egrets (or tufts) on the forehead, raised at will ; conch of the ear extending in a semicircle from the beak to the top of the head, and having a membranous operculum ; feet covered with feathers to the claws.

2. ULULA. *Chouettes*. — No egrets ; other characters like the Otus.

3. STRIX PROPER. *Effrayes*. — Ear of the Otus ; beak long, curved towards the end ; tarsi feathered ; hairs on the toes ; circles round the eyes much extended.

4. SYERNIUM. *Chats-Huans*. — Conch reduced to an oval cavity ; feet feathered to the claws ; other characters like the above.

5. BUBO. *Dukes, Ducs*. — Feet and conch of the preceding ; circles less marked ; egrets.

6. CHOUETTES A' AIGRETTES. — Egrets placed behind the head rise with difficulty.

7. NOCTUA. *Chevèches*. — Oval opening to the ear ; circles still less marked than the preceding.

8. SURNIA. *Chouettes éperviers*. — A long, graduated tail.

9. SCOPS. — Ears even with the head ; circles imperfect ; egrets.

The enormous pupil of their eyes admits so much light that they are dazzled by day. Their apparatus for flight is not strong, their hearing is acute, and their plumage soft and fine, so as to make no noise when flying. They can direct their outer toe backwards and forwards at pleasure, and they prefer flying at dusk or moonlight. When attacked by day, or struck by the sight of a new object, they make the most ridiculous gestures. They rarely feed on dead prey, and eat mice and small birds, swallowing feathers and hair, which, with the bones, they afterwards reject from the stomach by means of the mouth, in the form of balls. They eat much when they have an opportunity of doing so, but are able to fast for several consecutive days. Their skull has large cavities which communicate with the ear, and probably strengthen their hearing. The Grand Duke is the largest and handsomest of all nocturnal birds.

Owls are to be found in most parts of the world, and in many places they are objects of superstitious fear. They are said to look in at the windows of the apartments of sick persons, and hold converse with some one outside, and are constantly supposed to foretel approaching death. Mr. Waterton, in his interesting paper on the Barn Owl, says, "On the ruins of the old gateway, against which, tradition says, the waves of the lake\* have dashed for the better part of a thousand years, I made a place with stone and mortar, about four feet square, and fixed a thick oaken stick firmly into it. Huge masses of ivy

\* The lake which surrounds the island on which Mr. Waterton's house is built.

now quite cover it. In about a month after it was finished, a pair of Barn Owls came and took up their abode in it. I took upon myself the whole responsibility of all the sickness, woe, and sorrow that the new tenants might bring to the Hall. When I found that this first settlement had succeeded so well, I set about forming other establishments. This year I have had four broods. . . . . Confident of protection, these pretty birds betray no fear when the stranger mounts up to their place of abode. Whenever we go to look at them, we invariably see them upon the perch, bolt upright, with their eyes closed, apparently fast asleep. What Buffon and Bewick took for snoring is the cry of the young birds for food. When they have young they will bring a mouse to the nest about every twelve or fifteen minutes. But, in order to have a proper idea of the enormous quantity of mice which this bird destroys, we must examine the pellets which it ejects from its stomach in the place of its retreat. Every pellet contains from four to seven

skeletons of mice. In sixteen months from the time that the apartment of the Owl on the old gateway was cleaned out, there has been a deposit of above a bushel of pellets."\*

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## ORDER II. PASSERES.

THE characters of the Passeres† appear at the first glance to be negative, for they are neither Birds of prey nor Climbers, nor Shore birds, nor Gallinaceæ, nor Palmipedæ. A close comparison, however, with each other will show sufficient resemblance between themselves to establish them into a separate group. The great difficulty lies in their subdivisions, as they pass almost insensibly from one genus to another. They are not so fierce as the birds of prey, nor do they feed on any decided species of nourishment like the Gallinaceæ and water birds, but they seem to partake of all which come in their way, eating insects, smaller birds than themselves, reptiles, carrion, fruits, and seeds. Their stomach is in the form of a muscular gizzard, and many are gifted with the most exquisite powers of song. The shape of their beak, the proportions of their wings, and the extent

\* The author has presumed to alter a few words of this quotation, in order to compress it sufficiently for this work.

† The Insessores of many English naturalists.

of their flight, vary as much as their mode of living. The sternum of most of the adult birds has generally one notch on each side of its lower edge, but there are some exceptions to this formation. They have a larger share of brain than other birds in proportion to their size, and all their young are hatched bare of feathers.

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#### FAMILY I. DENTIROSTRES.

Beak notched on each side of the point.

The family of Dentirostres (see TABLE XXII.) contains the greatest number of those which feed on mice, reptiles, and insects, but which also eat berries and fruits.

#### TABLE XXII.

### CLASS II. AVES.

#### ORDER II. PASSERES.

Division 1. The external toe united to the internal by one or two joints, or nearly a third of their length.

Division 2. External toe almost as long as the middle toe, and united to it as far as the last joint but one.

##### Division 1

Family 1. DENTIROSTRES. — Beak notched on each side of the point.

- Family 2. **FISSIROSTRES.** — Beak short, flattened horizontally, slightly crook'd, deeply cleft, and no notch.
- Family 3. **CONIROSTRES.** — Beak strong, more or less conical, no notch.
- Family 4. **TENUIROSTRES.** — Beak slender, elongated, straight, or more or less arched, no notch.

Group I. **LANIADÆ.**FAMILY I. **DENTIROSTRES**GENUS I. **LANIUS.**

Beak conical or compressed, and more or less crook'd at the end.

Subgenus 1. **LANIARIUS.** *Lanius Proper, Shrike, Pies-grièches.* — Beak triangular at the base, compressed at the sides.

Section 1. Upper edge of beak arched.

2. Upper edge of beak straight, crook'd only at the end.
3. Upper edge of beak straight; lower mandible swelled; both strong.
4. **PRIONOPS.** *Pithys.* — Beak straight and slender; crest of upright feathers on the head.
2. **VANGA.** — Beak large, point much crook'd, lower mandible curved upwards.
3. **OCYPTERUS.** *Oxypterus, Artamus, Langrayen, Pies-grièches, Hirondelles.* — Beak conical, rounded in every part, slightly arched at the end, point very fine, slightly notched at the end.
4. **BERITA.** *Cracticus, Cassican.* — Beak large, straight, round at the base, sloping out the feathers in front, compressed at the sides, point crook'd, notched at the sides.

Subgenus 5. **CHALYBÆUS.** *Chalybès.* — Beak of the above, but smaller at the base; nostrils pierced in a large, membranous space.

6. **PSARIS.** *Tityra, Bécardes.* — Beak large, conical, round at the base, but not sloping the feathers of the head, point slightly compressed and crook'd.
7. **GRAUCALUS.** *Piroll, Ptilonorhyncus, Sphecothère, Choucaris.* — Beak slightly compressed, upper edge sharp, equally arched in its whole length, feathers covering the nostrils.
8. **BETHYLUS.** *Cissopes, Bethyles.* — Beak large, short, swelled.
9. **FALCUNCULUS.** *Falconelles, Pies-grièches-mésanges.* — Beak compressed, almost as deep as long, upper edge arched.
10. **PARDALOTUS.** *Pardalotes, Pies-grièches-roitelets.* — Beak short, slightly compressed, arched, upper edge sharp, point notched; tail short.

**GENUS II. MUSCICAPA.** *Flycatchers, Gobe-mouches.*

Beak horizontally depressed, hairs at the base, point more or less crook'd and notched.

Subgenus 1. **TYRANNUS.** *Tyrans.* — Beak straight, long, powerful, upper edge blunt, point suddenly crook'd.

2. **MUSCIPETA.** *Gnat Snappers, Moucheroles.* — Beak long, much depressed, twice as wide as high, point feeble, long hair at the base, or mustachios.

Section 1. **PLATYRHYNCHOS.** *Platyrhynques.* — Beak wider and flatter than others.

2. Legs long and tail short.

3. **MUSCICAPA PROPER.** *Drimophyles.* — Short mustachios; upper edge of beak sharp, point a little crook'd.

Subgenus 4. **GYMNOCEPHALUS.** *Bald-heads, Tyrans-chauves.*

— Upper edge of beak more arched than others ; great part of the face bare.

5. **CEPHALOPTERUS.** — Upright feathers at the base of the beak, forming a plume like a parasol.

### GENUS III. **AMPELIS.** *Cotinga, Querula.*

The flattened beak of the *Muscicapæ*, but shorter in proportion, wide and slightly arched.

Subgenus 1. **COTINGAS PROPER.** — Beak more feeble than others.

2. **TERSINA.** *Tersines.* — Beak wider at the base.

3. **CEBLEPYRIS.** *Campephaga, Caterpillar-catchers, Echenilleurs.* — Feathers of the rump prolonged, stiff, and prickly.

4. **BOMBYCILLA.** *Bombycivora, Chatterers, Jaseurs.* — Tuft of feathers on the head ; stems secondary wing pens enlarged into an o disk, looking like a spot of red sealing-wax.

5. **PROCNIA.** — Beak weaker and flatter than others, cleft to below the eye.

Section 1. **PROCNIA PROPER.** — Throat covered with feathers.

2. **CASIMARHYNCHOS.** *Averanos.* — Throat bare.

6. **CORACINA.** *Naked-necks, Gymnodères.* — Beak stronger than others ; neck partially bare.

### GENUS IV. **EDOLIUS.** *Drongos, Dicrurus.*

Beak flattened and notched, both mandibles slightly arched in their whole length ; nostrils covered with feathers, long hairs forming mustachios.

Subgenus 1. **PHIBALURES.** — Beak one half shorter than the head.



GENUS V. TANAGRA. *Tanagers, Tangaras.*

Beak conical, triangular at the base, upper edge slightly arched, notched towards the end; wings and flight short.

- Subgenus 1. EUPHONES. *Tangarus, Bouvreuils*.—Beak short, enlarged on each side of the base.
2. TANGARAS. *Tangara, Gross-beaks, Gros-becs*.—Beak conical, swelled, as wide as deep, upper edge round.
3. TANGARAS PROPER.—Beak shorter than the head, upper edge arched and rather sharp.
4. TACHYPHONUS. *Pyranga, Icteria, Tangaras, Loriots*.—Beak conical, arched, sharp, notched at the end.
5. TANGARAS. *Cardinals*.—Beak conical, somewhat swelled; a projecting obtuse tooth at the side.
6. TANGARAS. *Ramphocèles, Jacapa*.—Lower mandible enlarged towards the base.

GENUS VI. TURDUS. *Thrushes, Merles.*

Beak compressed and arched, but not crook'd, notches not deep.

- Section 1. BLACKBIRDS.—Colours uniform, distributed in large masses.
2. THRUSHES. *Mavis, Grives*.—Plumage speckled with small brown or black spots.
3. ASTRAPIA.—Tail three times as long as the body; double crest on the head.
4. LAMPROTORNIS. *Stournes*.—Feathers at the back of the head pointed.
5. IXOS. *Turdioides*.—Very slender beak.
6. ENICURES.—Tail forked; beak strong, straight, and slender.

Section 7. **TANYPUS.** *Grallines.*—Legs so high as to look like those of *Grallæ*.

8. **CRINIGER.** *Crinons.*—Strong hairs on the beak ; feathers of the back of the neck ending in a bristle.

**GENUS VII. MYOTHERA.** *Myrmothera, Ant-thrushes, Fourmilliers.*

Legs long ; tail short.

Section 1. **GRALLARIA.**—Beak thick and arched.

2. Beak straighter.

3. **RAMPHOCENE.**—Beak slender and sharp.

Subgenus 1. **ORTHONYX.**—Short, narrow beak, claws almost straight ; tail pens ending in a point.

**GENUS VIII. CINCLUS.** *Hydrobata, Water Ouzels, Cincles, Merles d'Eau.*

Beak compressed, straight, mandibles equally deep, sharpening towards the points.

**GENUS IX. PHILEDON.** *Meliphaga.*

Beak compressed, slightly arched all along, notched near the end ; nostrils large, covered by a cartilaginous scale ; tuft of hairs on the end of the tongue.

Section 1. **CREADION.**—Caruncles at the base of the beak.

2. Part of the cheek bare.

3. Plumage singularly arranged.

**GENUS X. EULABES.** *Mainates.*

Beak like that of thrushes ; nostrils round and united ; large bare places on each side of the back of the head, and one on the cheek.

GENUS XI. GRACULA. *Grakles, Martins, Gridothères.*

Beak compressed, slightly arched, and notched; the opening forming an angle; bare space round the eye.

Subgenus 1. MANORRHINA. *Manorrhines*. — Beak much compressed, slightly notched; large nostrils partly closed by a membrane, leaving an opening like a crack.

GENUS XII. PYRRHOCORAX. *Chocarels.*

Beak compressed, arched, notched; nostrils covered with feathers.

GENUS XIII. ORIOLUS. *Wit-walls, Loriots.*

Beak like that of thrushes, but stronger; feet shorter, and wings longer in proportion.

GENUS XIV. GYMNOPS. *Goulins.*

Same beak as above; nostrils round, without scales, encircled by a membrane; large portion of the head bare; some have a protuberance on the beak; a tuft of hairs on the end of the tongue.

GENUS XV. MÆNURA. *Lyre-tails, Lyres.*

Beak as above; nostrils membranous and wide, partly covered with feathers; tail of the male bird large, and in the shape of a lyre.

GENUS XVI. MOTACILLA. *Becs-fins.*

Beak like a bodkin.

Subgenus 1. SAXICOLA. *Ænanthe*. — Beak a little depressed, wide at the base.

2. SYLVIA. *Ficedula, Red-throat, Red-breast, Rubiettes*. — Beak narrower at the base than the above.

3. CURRUCA. *Nightingales, Lingets, Fauvettes*. — Beak straight and slender, a little compressed in front, upper edge a little curved near the point.

Subgenus 4. **RÉGULUS.** *Wrens, Roitelets Figuiers.* — Beak like a sharp cone; sides looking concave.

5. **TROGLODYTES.** — Beak as above, slightly arched.

6. **MOTACILLA PROPER.** *Wagtails, Hoche-queue.* — Beak very slender; tail long, incessantly moving up and down; legs long; scapularies long enough to cover the wing when folded.

Section 1. **LAVANDIÈRES.** — Nail of the outer toe curved.

7. **BUDYTES.** *Bergeronnettes.* — Nail of outer toe long and arched.

8. **ANTHUS.** *Farlouses.* — Long nail to outer toe; beak slender and notched.

#### GENUS XVII. PIPRA. *Manakins.*

Beak compressed, deeper than wide, notched; nasal furrows large.

Subgenus 1. **RUPICOLA.** *Cock of the Rocks, Coqs de Roche.* — A double, upright crest on the head, spread like a fan.

2. **CALYPTOMÈNES.** — Feathers on the head closed.

3. **MANAKINS PROPER.** — Very small, and brilliant in colour.

#### GENUS XVIII. EURYLAIMUS. *Eurylaimes.*

Beak enormously flattened and wider at the base than the head, point slightly crook'd and notched on each side.

Shrikes Proper utter piercing cries while they pursue their rapid and unequal flight, and imitate the songs of other birds which happen to live near them. That species named the Butcher-bird was called the Sentinel by falconers, for, when pur-

posely fastened to the ground, its loud screams always gave notice of the approach of the hawk. They are all courageous and cruel, defend themselves bravely against larger birds, and some of them leave England during the winter. Mr. Gould, in his splendid work on the birds of Australia, mentions one which he calls the "Satin Bower Bird" (*Ptilonorhynchus holosericeus*), which makes "a bower-like structure for the purpose of a playing ground, or hall of assembly. It lives in the thick brushes between Port Philip and Moreton Bay, the cedar brushes of the Liverpool range and mountain gullies, and is at present supposed to exist only in New South Wales. It is almost exclusively frugivorous or granivorous\*; insects forming but a very small portion of its food. These bowers are usually placed under the branches of a tree in the most retired part of the forest, and vary in size. There is first a convex platform of sticks firmly interwoven, on the centre of which the bower is built, or twisted with sticks, and is formed of slender, flexible twigs, the tips of which curve inwards, and nearly meet at the top. The forks of the twigs being always outwards, there is no obstacle to the passage of the birds. It is decorated at and near the entrance with the gayest coloured things which can be collected, such as feathers, snail shells, bones, &c., some of the feathers being entwined among the twigs; and the propensity of these birds to pick up everything and fly away with it is so well known,

\* Seed or grain eating.

that the natives always search the bowers for what they have lost. Round and through these bowers the birds sport, but whether they are frequented all the year is not known.”\*

The Flycatchers appear in England when the oaks have put forth their foliage. They frequent orchards and gardens, and are so little afraid of man, that they have been known to build on the ornamental top of a lamp near Portland Place. The parasol-like crest over the heads of the Cephaloptera gives them a dignified appearance. They come from the borders of the Amazon, and are of a glossy black colour.

Thrushes are celebrated for their songs, which in sweetness are next to those of the nightingale. The common species resides in England throughout the year, and its voice is heard from early in the spring till the end of autumn. When it eats snails, it breaks the shells against a stone, and shakes the pieces off before it swallows the animal. It sometimes feeds on grapes, and at the time these are ripe, acquires a flavour which makes it much sought after for the table. The Missel-thrush, or storm-cock, has much the same song as the blackbird, and has received the second name from its custom of singing before, and during wind and rain throughout the winter. It is the largest of the thrushes, is exceedingly fond of the berry of the mountain ash; and Mr. Waterton says of it—“This year there is a storm-cock’s nest within fifteen yards of the place where the masons

\* Altered from Mr. Gould’s work.

are at work. Our tame magpie which is allowed its freedom, and the use of its wings, seized the female some days ago, and brought her close to the masons. The male bird instantly came up and rescued his mate, by fighting the magpie, until he made it let go its hold. This loving couple retired triumphant to their nest, but the female lost half of her tail in the fray." The Blackbird is a subgenus of Thrush, and has a powerful and sweet song, without much variety; it imitates the notes of other birds, in which however it must yield to the Mocking-bird.

The Water Ouzel, in the genus *Cinclus*, dives with great facility, and feeds upon the insects which it finds at the bottom of the water. The stories told of its walking under this element are only idle tales. It is destroyed in some parts of Scotland, from the idea that it feeds upon the salmon spawn.

The Orioli make but a short stay in Europe, and that during the warmest part of the year. They are shy, but sportsmen will sometimes deceive them by whistling their notes, and so get near them; but the ear of the bird is so correct, that one false intonation gives him warning, and he instantly flies away.

The Lyre-tails are so called from the shape assumed by the feathers of the tail, in the male bird. There are the usual twelve pens, but their beards are thread-like and wide apart. Added to them are two more in the middle, having beards only on one side, close together, and two outside, curved like the supports of a lyre, the wide inner beards of which represent a ribbon, and the external, which are very short, only

getting large towards the end. They are from the rocky districts of New Holland.

Many of those birds most familiar to us in England are to be found in the genus *Motacilla*. The sub-genus *Saxicola* affords the Wheat-ear, or Fallow-chat, which is one of the earliest of our guests; it nests in various places, even under ground or clods of earth, but never in trees. It abounds in hundreds on the Sussex downs, and is much esteemed for the table. Among the *Sylvia* is the Robin, which foretells the weather as faithfully as the storm-cock; for if he sing cheerfully on the summit of a tree or house, although the sky may then appear to be unsettled, it is a sure sign of fine weather. They build their nests fearlessly in the midst of the noisy and bustling occupations of man, such as blacksmiths' shops, &c., and are not alarmed, although their nests may be frequently inspected: they are said to choose their mates for life, and are very quarrelsome among themselves. The *Sylvia arundinacea*, or reed warbler, "builds its nest between the reed stems of very long grass, wound horizontally round and round, including the four upright reeds in the substance,



thus forming, with a little wool, the sides of the nest, which frequently measures six inches in depth on the outside, and very often three inches deep inside, and is lined with very fine grass and long hairs. It is

made so deep that the eggs may not roll out when the supporting reeds are waved by the wind; and Montague observes, that he has seen the bird sitting on her nest, when every gust forced it almost to the surface of the water.\* But this nest is surpassed by that of the *Sylvia sutoria*, which spins cotton wool into a thread with its beak and claws, and sews the leaves together which surround its nest, in order to hide it from its enemies.

The Nightingale belongs to the third subgenus; and whether known or unknown to them, is the favourite bird of the poets, and by far the sweetest of all feathered songsters. They make their first appearance in England in April, and the males come before their mates. Their name is derived from the Saxon words, *nacht*, night, and *galan*, to sing: they however frequently sing in the daytime. They are found as far north as Sweden and Russia, and yet have a very limited range in England, and are never found in Ireland. The imagination of the Scotch has supplied them with allusions to this bird, for it is

\* "Yarrell's *British Birds*."

never found there, although Sir John Sinclair made strenuous efforts to introduce it. The cockchafers mentioned in the account of Bears in the preceding pages were generally accompanied by numerous nightingales, who, night and day, made the garden ring with their notes, and feasted on these insects.

The smallest birds in Europe are among the wrens, and some of them come from more northern regions, and remain with us during the winter. The Golden-crested Wren weighs only 67 grains, and its heart is no larger than a pea. Nelson relates an anecdote of a mower, who having hung his coat under a shed, took it down at the end of two or three days in order to put it on; and when he thrust his arm into one of the sleeves, he there found a wren's nest completely finished and lined with a quantity of feathers. In the same subgenus is the Titlark, which lives in damp meadows, and, like the thrush in France, gets so fat by feeding on ripe grapes, that it becomes very delicate eating.

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## FAMILY II. FISSIROSTRES.

Beak short, wide, flattened horizontally, slightly crook'd, much cleft; no notch.

The shape of the head, and the wide opening which the mouth presents, make the Fissirostres a very distinct family. They feed principally on insects; and almost all leave Europe during the winter. They

are, like birds of prey, divided into Diurnæ and Nocturnæ; see Table XXIII.

### TABLE XXIII.

## CLASS II. AVES.

### ORDER II. PASSERES.

#### Group I. LANIADÆ.

#### FAMILY II. FISSIROSTRES.

Group 1. DIURNÆ. — Those which fly by day.

2. NOCTURNÆ. — Those which fly by night.

#### Group 1. DIURNÆ.

#### GENUS I. SWALLOWS. *Hirondelles*.

Close plumage; wings extremely long; flight rapid.

Subgenus 1. CYPSELUS. *Apus, Martins, Martinets*. — Tail forked; feet very short; great toe brought nearly as forward as the other toes; middle and external toes with only three joints.

2. HIRUNDO PROPER. *Swallows*. — Great toe inclined to turn forwards; tail forked.

#### Group 2. NOCTURNÆ.

#### GENUS I. CAPRIMULGUS. *Goat-suckers, Dor-hawks, Night-jars, Engoulevents, Têtes-chevres*.

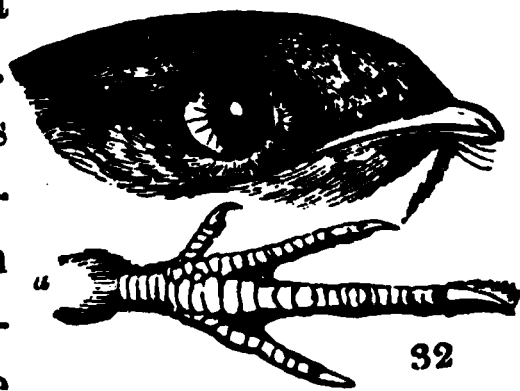
Soft, light plumage; beak much cleft; nostrils like tubes; toes united at the base by a short membrane, the great toe united to the next; external toe has only four joints; nail of middle toe is dentated at its inner edge; tarsi feathered.

Subgenus 1. PODARGUS. *Podarges*. — Beak stronger than the above; no membranes between the toes; the middle claw plain.

The first genus of the former is that of Swallows ; and all that compose it are eminently adapted for vigorous flight : their wings are enormously long in proportion, their feet short, their wing bones strong, their merrythought oval, and their sternum without a notch ; all of which tend to support them in their long journeys over oceans and continents. They cannot spring from the ground ; and therefore pass the greater part of their lives in the air, pursuing the insects of upper regions. They nest in the holes of rocks, walls, &c., and climb the smoothest surfaces with rapidity. The species called the Swift comes from Africa in May, and generally leaves England in August. It returns to the same nest for years, and in high winds remains motionless in its hole : at other times it is to be seen wheeling about with inconceivable rapidity, and screaming as it seeks its prey. So eager is its flight, that it sometimes dashes itself against a hard substance, and is killed by the blow. Its nest of moss, dried grass, &c. is glued together with its saliva, and when dry is very hard. Some of the Swallows proper have their feet covered with feathers to the claws, and also come from Africa. Many spend the winter in Italy, Madeira, &c., and return to England for six months. They are sometimes so fatigued by their long flights, that they die of exhaustion ; and have been often seen to lie flat upon the sea, with their wings extended as if to rest, and after a short time fly off again. They build their nests in, or close to, the habitations of men, choosing windows, chimney-tops, projecting

beams, &c. ; and on one occasion they were known to build in an open drawer of a small deal table left in a garret, the broken window of which gave them access to the room. They occasionally delay their departure to take care of their young, if it should so happen that they have a second brood. Not so the martins ; which, when the period for migration arrives, abandon their offspring. The land martin builds in high banks, forming a colony in them, and excavating their holes with their beaks. A very small species in the Indian Archipelago forms its nest of a peculiar kind of seaweed, which is gelatinous, and nearly white, and which it bruises and macerates before use. This substance is supposed to be very nourishing, and is an important article of commerce in China and Japan. It is dressed like mushrooms, has an insipid taste, though peculiar ; the clean nests are selected for eating, and those which are dirty are converted into glue.

The *Caprimulgus* has large eyes, and the upper mandible is furnished with a row of hairs on each side. The size of their beak, and its wide fissure, enable it to swallow the largest insects, which it retains by means of a glutinous saliva. Its wings are long, it lives alone, and flies about at twilight, or during a fine night. The air which enters its large beak causes a humming noise ; it lays its eggs upon the ground, or upon a stone, sits on them but a



short time, and frequents heaths and commons. The European visiter is a native of Africa; and its dentated claw is supposed to be of use in seizing its prey and conveying it to its mouth, although some suggest that it is to comb its moustaches. The goat-sucker is found in America and New Holland, and in the former country is a large species, celebrated for its loud cries. One of the African species has a feather, twice as long as its body, springing from each wing, and having beards only at the extremities. The name of Goat-sucker has been given in consequence of its frequenting the haunts of cattle, and picking the insects from their bodies and udders as they repose on the ground at night. The Americans declare that the cry of one resembles the sentence of "Whip poor Will," and therefore call the bird by that name. That of Demerara, says Mr. Waterton, utters Ha! several times, diminishing in loudness as it ends; and several curious similarities have been found between the noises which they utter and various sentences; such as, "Who are you, who! who!" "Work away! work! work!" "Willy, come go!" "Willy! Willy! Willy!" &c. The Indians never destroy them, for they believe that the souls of departed brethren live in them to haunt cruel masters, &c. If the goat-sucker should cry near a white man's door, it is indicative of sorrow to the inhabitants; and if near that of the negroes or Indians, misfortune is announced, which is awaited in terrible suspense. The owlet, night-jar, *Ægotheles Novæ Hollandiæ*, according to Mr. Gould, is

found in every part of Van Diemen's Land, and the southern portion of Australia. Its habits much resemble those of the smaller owls. During the day it remains in the hollow branches and holes of the gum tree, and flies at night after insects. When assailed, it utters a loud hissing noise: it carries its head as owls do, and, like them, turns it in every direction. When a hollow tree in which it has taken up its abode is tapped with a stone, &c., it invariably peeps out from the hole to see what is the matter, and if its retreat be inaccessible, it retires; but if the noise be repeated, flies away. It deposits four or five nearly round, white eggs in these holes, without any nest.

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### FAMILY III. CONIROSTRES.

Beak strong, more or less conical; no notches.

Those Coniostres (see Table XXIV.) which feed exclusively upon grain, have a larger and thicker beak than others. Larks are among them; and are not only able to break the hardest seeds, but to crack fruit stones.

The species called Woodlark sings on trees in plaintive notes, and is, like the nightingale, to be frequently heard during warm summer nights. It builds its nest on the ground, and is much sought after to put in cages. It visits most parts of England, some localities in Scotland, and resides all the year round in middle Europe.

## TABLE XXIV.

## CLASS II. AVES.

## ORDER II. PASSERES.

## Group I. LANIADÆ.

## FAMILY III. CONIROSTRES.

GENUS I. ALAUDA. *Larks, Alouettes.*

Nail of the great toe straight, powerful, and larger than the others; beak generally straight, pointed, and of moderate size.

GENUS II. PARUS. *Titmice, Mésanges.*

Beak slender, short, conical, having small hairs at the base; nostrils hidden in the feathers.

Subgenus 1. — Moustaches; upper mandible a little curved at the end.

2. REMIZ. — Beak thinner and more pointed.

GENUS III. EMBERIZA. *Buntings, Bruants.*

Beak conical, short, straight; upper mandible narrower, and entering within the lower; a hard and projecting tubercle on the palate.

Subgenus 1. PLECTROPHANES. — A long nail to the great toe like the Larks.

GENUS IV. FRINGILLA. *Sparrows, Moineaux.*

Beak conical, more or less thick at the base; the commissure (or opening of the lips) not angular.

Subgenus 1. PLOCEUS. *Weavers, Tisserins.* — Large beak, upper mandible slightly swelled.



Subgenus 2. **PYRGITA.** *Sparrows Proper, Arremon, Passerina.* — Beak a little swelled at the point, and a little shorter than the above.

3. **FRINGILLA.** *Pinçons.* — Beak a little less arched than others.

4. **CARDUELIS.** — Beak perfectly conical, but not swelled.

Section 1. **GOLDFINCHES.** *Chardonnerets.* — Beak longer and sharp.

2. **LINARIA.** *Linnets, Linottes.* — Beak shorter and more obtuse.

3. **CANARY BIRDS.** *Serins, Tarins.* — More or less green in colour.

Subgenus 5. **VIDUA.** *Widow Birds, Veuves.* — Beak of the Linnet, but swelled at the base; pens of the tail much elongated in the male birds.

6. **COCOTHRAUSTES.** *Grossbeaks, Grosbecs.* — Beak extremely thick and large.

7. **PITYLUS.** — Beak equally large, compressed, arched above, sometimes with a projecting angle on the edge of the upper mandible.

8. **PYRRHULA.** *Bullfinches, Bouvreuils.* — Beak rounded, swelled in every part.

**GENUS V. LOXIA.** *Crossbills, Grossbeaks, Becs-croisés.*

Beak compressed, each mandible so much curved that their points cross each other.

**GENUS VI. CORYTHUS.** *Strobiliphaga, Psittacirostra, Hardbeaks, Durbecs.*

Beak swelled in every part: point of the upper mandible curved over the lower.

GENUS VII. COLIUS. *Colies, Colious.*

Beak short, thick, conical, somewhat compressed; both mandibles arched.

GENUS VIII. BUPHAGA. *Beef-eaters, Pique-bœufs.*

Beak moderately long; both mandibles swell just before the end, where they terminate bluntly.

GENUS IX. CASSICUS. *Cassicans, Cassiques.*

Beak exactly conical, large at the base, very sharply pointed; small nostrils pierced at the sides, commissure forming an angle.

Subgenus 1. CASSICANS PROPER. — Beak forming a semicircle with the feathers of the head.

2. ICTERUS. *Troupiales.* — Beak forming a sharp notch with the feathers of the head; arched in its whole length.

3. XANTHORUS. *Agelaius, Carouges.* — Beak perfectly straight.

4. OXYRHYNCHUS. *Oxyrinques.* — Beak shorter than the head.

5. DACNIS. *Pits-pits.* — Like the Xanthornus in miniature.

GENUS X. STURNUS. *Starlings, Etourneaux.*

Beak flattened, especially at the point.

GENUS XI. CORVUS. *Crows, Corbeaux.*

Beak strong, more or less flattened at the sides; nostrils covered by stiff feathers directed forwards.

Subgenus 1. CORVUS PROPER. — Upper edge of upper mandible much arched; tail round or square.

2. PICA. *Magpies, Pies.* — Tail long and graduated, less than crows.

Subgenus 3. **GARRULUS.** *Jays, Geais.* — Both mandibles ending in a sudden and equal curve.

4. **CARYOCATACTES.** *Nucifraga, Nutcrackers, Casse-noix.* — Both mandibles pointed, and no curve.

5. **TEMIA.** *Crypsirina, Phrenotrix.* — Upper mandible of beak swelled; base furnished with velvet-like feathers.

6. **GLAUCOPIS.** *Callæas.* — Two fleshy caruncles at base of beak.

**GENUS XII. CORACIAS.** *Galgulus, Rollers, Rolliers.*

Beak strong, compressed at the end, point a little crook'd.

Subgenus 1. **ROLLERS PROPER.** — Beak straight, deeper than wide.

2. **COLARIS.** *Eurystomus, Rolles.* — Beak short; more arched, less deep than wide.

**GENUS XIII. PARADISÆA.** *Birds of Paradise, Oiseaux de Paradis.*

Beak straight; nostrils covered with velvet-like feathers; other feathers of the bird more or less developed.

M. Audubon describes the shore larks as breeding in the high and desolate tracts of Labrador, close to the sea, and placing their nests on tufts of moss and lichen; and Captain James Ross found one as far north as Felix Harbour. The skylark is a great favourite in almost every country in Europe, and supplies poets with many allusions and metaphors. It rises perpendicularly to a great height, singing the whole time, and its notes are heard long after it is out of sight; but if a hawk should appear, it closes its wings, and drops to the

ground like a stone. Its nest is placed on the ground; and it is fond of lying in the dust, and throwing it over its body. In the 2d volume of *The Naturalist* is the following anecdote:—  
“The other day some mowers shaved off the upper part of the nest of a skylark without injuring the female, who was sitting on her young; still she did not fly away; and the mowers levelled the grass all round her, without her taking any notice of their proceedings. A young friend of mine, son of the owner of the crop, witnessed this; and about an hour afterwards went to see if she were safe, when, to his great surprise, he found that she had actually constructed a dome of dry grass over the nest during the interval, leaving an aperture on one side for ingress and egress, thus endeavouring to secure a continuance of the shelter previously supplied by the long grass.” Thousands of skylarks are killed every winter for the table; and Dunstable in England, and Leipzig in Germany, are the great markets for them.

Titmice are very lively little birds, flying, climbing, and suspending themselves from branches of trees; eating seeds and insects, and even lesser birds when these happen to be ill, and too feeble to resist. They lay up stores of provisions; nest in the holes of old trees; and lay more eggs than any other of the Passeres. There are several species which winter in England; but one alone remains in the woods and fields, the others seek the vicinity of man. The Blue Titmouse frequents butchers' shops, eats flesh

of all kinds, and breaks off the buds of fruit-trees in search of insects. The bearded titmouse swallows the *Succinea amphibia*\* shell and all. The clear ringing notes of these pretty birds are to be heard amongst the tall reeds by the sides of rivers; and, when disturbed, they run rapidly down the stalks, and hide themselves in the thick foliage at the bottom.

The Remiz lives in the south and east of Europe, and makes a nest in the form of a purse of the down proceeding from the catkins † of the willow and the poplar, lines it with feathers, and suspends it from the flexible twigs of trees by the water side. A species at the Cape builds its nest in the form of a bottle, and adds to it a small cupola or dome, in which the male rests while the female hatches the eggs.

Buntings are granivorous birds, and easily caught in snares. The Snow Bunting breeds in the Arctic regions; and Captain Lyon found one of its nests made in the bosom of an Esquimaux child who was a corpse. A curious proof of the destructive propensities of the common Bunting is related in the *Journal of a Naturalist* where it is stated, "that

\* An animal like the snail, which "cannot entirely enter its shell: it lives upon herbs and shrubs, on the borders of rivulets, and appears to be almost amphibious. It is found in England, and other parts of Europe, Van Diemen's Land, Guadaloupe," &c. *Popular Conchology*, by Agnes Catlow, p. 179.

† The long hanging bunches of blossoms belonging to these trees.

a rick of barley, standing in a detached field, was entirely stripped of its thatching by Buntings, so as to make its immediate removal necessary. This was effected by the Bunting drawing the straw out by one end to seek for grains. The base of the rick was surrounded by the straws. Other birds burrow into the stack; but this practice of unroofing belongs to the Bunting alone." The Ortolan Bunting only visits the middle and northern parts of Europe during the summer; but abounds in the south when the swallows appear. They build in fields of corn, and are often fattened for the table. Mr. Gould says, "that when caught in nets, they are kept in a dark room, and fed with plenty of oats and millet seed;" and another author states, that "they become lumps of fat weighing three ounces, some of which are potted, or otherwise preserved, and sent to various countries."

The numerous *Fringillæ* include those birds which are most often reared in cages, and at the same time presents those which are most voracious and destructive in grain countries. Weavers have received their name from the skilful manner in which they interlace the blades of grass, hairs, &c. with which they make their nests. Among them are the Republicans, which are found at the Cape, and con-

struct their nests in numbers under one common roof, encircling the trunk of a tree, and supported by its branches.

The common sparrow is known to every one as a bold, pert-looking, pugnacious bird, abounding in all places, even in London. One pair will rear fourteen young birds every season. They build upon, or near, houses; often attach their nests to those of the rook; and if constructed on a tree, form a dome of moss or hay, and enter at the side. A note in the first volume of the *Zoological Journal* states, that "a few years since a pair of sparrows, which had built in a thatched roof of a house at Poole, were observed to continue their regular visits to the nest long after the time when the young birds take flight. This unusual circumstance continued throughout the year; and in the winter a gentleman, who had all along observed them, determined on investigating the cause. He therefore mounted a ladder, and found one of the young ones detained a prisoner, by means of a piece of string or worsted, which formed part of the nest, having become accidentally twisted round its leg. Being thus incapacitated for procuring its own sustenance, it had been fed by the continued exertions of its parents."

Goldfinches are among the prettiest birds of Europe; are very docile, sing sweetly in confinement, and acquire a great many tricks. They are found in most of the countries in Europe and Asia; and abound in London near any spot of waste ground in which thistles are growing. They live a long time;

and Gesner mentions one which was white and feeble with age, having lived twenty-three years, and whose nails and beak were cut every week, so as to enable it to eat.

Linnets take their name from their fondness for hemp and flax-seed \*, and are usually seen in flocks. Their voices are powerful even when in confinement, to which they easily accustom themselves. They are common to Europe and North America.

Canary birds are as numerous in the islands whence they derive their name, Madeira, and the Azores, as sparrows are in England. When wild, they are entirely of an olive or yellowish green. They, in common with goldfinches and bullfinches, may be taught to perform a number of tricks: such as standing on their head; pretending to be dead; mounting guard as sentinels, when they rouse the soldiers, and fire off small cannons; feigning a wound, and lying in a wheelbarrow to be carried to the hospital, &c.

The Chaffinch is a handsome, courageous, bird; very apt to eat radish-seed, and commit other misdemeanours of the same kind. It extends its flight as far south as Madeira and the Canary Islands, and is known in Sweden. In this country the males remain, and the females emigrate.

Bullfinches are very voracious, and great consumers of the flower-buds of fruit-trees. They choose a mate for life; but quit their nests when

\* *Linum*, the Latin name for flax.



disturbed. Their powers of imitation are remarkable, extending even to the acquirement of different melodies; and those taught in Germany generally whistle waltzes in the most perfect manner. They learn best immediately after eating; and the lessons must be continued while they are moulting, or they will forget all they have learned. The Author had one which could never recollect more than three airs at a time, and if it learned a new tune, abandoned one of the others. It was amusing to listen to its efforts, and the pains it took to accomplish its task. It would repeat all it knew, and then hesitatingly bring out two or three notes at a time. The moment it had succeeded, it sang the whole over again in the most triumphant manner, and seemed to expand its wings with delight. They are generally taught by weavers, while the latter are at their looms; and the motion made by their heads during their occupation is said to account for the readiness with which a Bullfinch always sings when any one stands before its cage and moves his head from side to side.

Crossbeaks were in former times rare visitors in England. Some curious old records are in existence stating the periods of their appearance, one of which, quoted by Mr. Yarrell, mentions that "1593 was a great year for apples, and that the Crossbeaks then abounded, which bored the apples to get at the seeds." They are now established in England, which is supposed to be owing to the increased number of fir plantations; the curious formation of their beaks enabling them to take the seeds from under the scales

of the cones. They are generally to be found wherever there are forests of evergreen trees. The beaks of the young birds are said not to be crossed till they are obliged to get their own living. Mr. Yarrell gives a detailed and interesting description of the peculiar bones and muscles which assist this formation: and Mr. Towson says of them, "The degree of the lateral power is surprising, and they are fond of exercising it for mere amusement: they are, therefore, not a little mischievous."

Hardbeaks have the same habits as the above, and live chiefly in the north of the globe.

The beak of the Beefeaters enables them to squeeze out the larvæ of insects, when they have been lodged in the skin of cattle, and on which these birds feed.

Starlings feed on insects, worms, snails, berries, and grain, and in the south of Europe, on grapes and figs. They abound in every part of the Old World, assemble in close and numerous flocks, are easily tamed, and learn to sing, even to speak. They generally quit England in the spring. Mr. Waterton has done much towards proving that the starling is falsely accused of several mischievous propensities, among others, that of sucking pigeons' eggs: his observations inform us that these beautiful birds only enter the dove-cot for protection, and that the true rogues are the rat and the weasel. He adds, that they quit this country only because they do not find sufficient shelter for their nests, and as proof that they will stay, he had twenty-four holes made in the ivy-covered tower, over the ancient gateway, and twenty-

four pairs of birds have bred therein. At Mr. Miles's, at King's Weston, they assembled in such numbers, in the plantations of evergreens, that they drove away the pheasants. The rose-coloured starling is held sacred in Aleppo, because it devours the locusts, and combines the notes of other birds with its own.

Crows may be reckoned amongst the most cunning of the feathered race: they have a particularly delicate smell, and take away and hide that which is perfectly useless to them. Crows proper are the largest of the genus; and of all European Passeres, they are more retired than other species, fly high, and, besides carrion, eat all sorts of fruit and small animals, even taking young chickens from the farm-yard. They are to be found in all parts of the world; and those in the north have a mixture of white with their plumage. They are to be heard croaking at the first approach of daylight, and retire to roost at a late hour on high trees, where they build firm and compact nests: their eggs are irregular in size and colour; and their young are as good to eat as rooks at the same age. They imitate the human voice in a manner which rivals the parrot. The Chough, or red-legged crow, has a shrill voice; and Montagu's description of its domestic habits is as follows:—  
“His curiosity is beyond bounds, never failing to examine every thing new to him: if the gardener be pruning, he examines the nail box, carries off the nails, and scatters the shreds about. Should a ladder be left against the wall, he instantly mounts, and goes all round the top of the wall; and if hungry,

descends at a convenient place, and immediately travels to the kitchen window, where he makes an incessant knocking with his bill until he is fed or let in: if allowed to enter, his first endeavour is to get up stairs; and if not interrupted, goes as high as he can, and gets into any room in the attic story: but his intention is, to get upon the top of the house. He is excessively fond of being caressed, and would stand quietly by the hour to be smoothed; but resents an affront with violence and effect, by both bill and claws, and will hold so fast by the latter, that he is with difficulty disengaged. He is extremely attached to one lady, upon the back of whose chair he will sit for hours. . . . His natural food is evidently the smallest insects. . . . The common grasshopper is a great dainty, and the fern-chaffer is another favourite morsel: these are swallowed whole; but if the great chaffer be given to him, he pulls it to pieces and eats it by piecemeal. Worms are wholly rejected, but flesh, raw or dressed, and bread, he eats greedily, and sometimes barley with the pheasants, and other granivorous birds, occasionally turned into the gardens, and never refuses hemp seed. . . He is naturally pugnacious, and the hand that the moment before had tendered him food and caresses, will repent an attempt to take him up. To children he has an utter aversion, and will scarcely suffer them to enter the garden. Even strangers of any age are challenged vociferously: he approaches all with daring impudence; and so completely does the sight of strangers change his affection for the time, that

even his favourites and best benefactors cannot touch him with impunity, in these moments of evident displeasure."

The Raven is bold, keen, and sagacious, and directs its first attack upon the eyes of the animal on which it is going to make a repast: it eats every animal substance which comes in its way, lives to a great age, chooses a mate for life, and defends its nest vigorously against other birds, even the Vulture and the Eagle, but not against man. It braves the rigours of an arctic winter; but some of them go south in severe weather. It speaks so plainly that it has more than once been known, by uttering exclamations of surprise and alarm, to turn out a guard of soldiers when placed in their neighbourhood. Mr. Waterton's account of his favourite raven is to be found in his interesting essays.

Rooks are distinguished from the rest of the genus by living together in numbers at all seasons. They always build their nests in the neighbourhood of man, and even in the heart of crowded cities. A curious instance of their sagacity is related by Mr. Yarrell. An old mansion, not far from London, was surrounded by a number of very fine elms: "many of these trees had become very old, and it was therefore determined to fell a few of them every year, and plant young ones in their place. The eldest of the trees were accordingly condemned to be felled, and a portion of the bark taken off to indicate those which were to come down. These trees were soon forsaken by the rooks, and it was subsequently ob-

served, that immediately after any of the other elms were marked in a similar manner, the rooks at once forsook the trees, as if fully aware that the removal of the bark was a notice to quit." Rooks are said to injure pastures by pulling up the grass by the roots ; but these roots which they thus take from the soil have generally been partially devoured by an insect, which is the object of their search, and which would probably have entirely destroyed them. Farmers who have exterminated rooks from their land, have been glad to re-stock their farms with these birds, as, during their absence, the crops entirely failed. They are not found far to the north, and their distinguishing mark is, having a bare space at the base of the beak and on the throat, in consequence of the feathers falling off these parts when they are a few months old.

Jackdaws are even bolder than rooks, and frequent high towers and steeples : there are many in the highest parts of Windsor Castle, but they sometimes build in hollow trees, and even rabbit burrows. They make their nests of pieces of wood ; and some who lived in the neighbourhood of the Botanical Gardens, at Cambridge, helped themselves to all the wooden labels placed in the ground, to mark the names of plants or seeds just sown. Eighteen dozen of these were taken from the shaft of one chimney, and restored to the curator. They are said to pair for life.

The old fable told by Ovid, that Magpies are women changed into birds, on account of their loquacity, well expresses their habits ; and they certainly betray many of the propensities which, whether

deserved or not, are ascribed to the female sex. They are noisy, chattering, and inquisitive, fond of hoarding, collect together in small numbers, and evince the most intense affection for their young. Their plumage has a beautiful metallic lustre; they live on all kinds of animal food, scream loudly at the approach of danger, and learn a great many tricks. They abound in France, as they are there left unmolested; also in Norway, where they are always upon the most affectionate terms with man, and where a sheaf of corn is always placed at the end of the house for their Christmas dinner. In England, on the contrary, they are destroyed, from the supposition that they do a great deal of mischief to game, and are birds of ill omen. They chiefly inhabit the northern parts of the globe, and they and frogs are said to have been introduced into Ireland in the reign of Queen Anne. They are of great use to cattle, as they pick the insects from them which lodge in their skin.

Jays are found in cold and in warm countries, and are every where beautiful. The plumage of those between the tropics differs much from those of colder regions. The latter are remarkable for a blue and black crest upon their head and tectrices\*, similarly marked. They are great imitators of sounds, are solitary birds, and feed upon acorns, grains, berries, &c. The Nutcracker is rarely seen in England, and is more common in the pine forests of middle Europe.

\* Covering feathers of the wing.

They extract the seeds from the fir cones, by fixing the latter in the crevice of a tree, and then pulling the seed out by force.

Birds of Paradise are so called from the extreme beauty of their plumage, the brilliancy and elegance of which, in some of the species, cannot be surpassed. Some have elongated plumes on each side, by which they are often supported, and even carried away by the wind without the assistance of wings. The natives of New Guinea and the neighbouring islands used to cut off the feet and wings of these birds, and consequently, it was long believed that the feathers of the body acted in place of the latter, and that they always lived in the air. They feed on fruit, and are very fond of spices.

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#### FAMILY IV. TENUIROSTRES.

Beak slender, long, sometimes straight, sometimes more or less arched; no notch.

#### TABLE XXV.

#### CLASS II. AVES.

#### ORDER II. PASSERES.

#### Group I. LANIADÆ.

#### FAMILY IV. TENUIROSTRES.

#### GENUS I. SITTA. *Nuthatches, Sittelles, Torchepots.*

Straight, pointed, prismatic beak, compressed towards the end.



Subgenus 1. **XENOPS.** *Sittines.* — Beak more compressed; lower edge more convex.

2. **SYNALLAXIS.** — Beak straight, much compressed, slender and pointed.

**GENUS II. CERTHIA.** *Creepers, Grimpereaux.*

Beak arched.

Subgenus 1. **CERTHIA PROPER.** — Pen feathers of the tail worn, and ending in a point.

2. **DENDROCOLEPTES.** *Dendrocopus, Picucules.* — Beak strong and transversally wide, sometimes twice as long as the head, arched at the end.

3. **TICHODROMA.** *Petrodroma, Wall-creepers, Echelettes.* — Claws large; beak triangular, very long and thin.

4. **NECTARINIA.** *Cæreba, Sugar-birds, Sucriers, Guit guits.* — Beak moderately long, arched, pointed, and compressed.

6. **DICÆUM.** *Dicées.* — Beak sharp, arched, not longer than the head, wide at the base.

6. **MELITHREPTUS.** *Héorotaires.* — Beak very long, curved almost into a semicircle.

7. **CINNYRIS.** *Souï-mangas.* — Beak long, very slender, dentated at the edges like a saw.

Section 1. Tail equal.

2. Two middle tail pens largest in the male.

3. Beak quite, or nearly, straight.

8. **ARACHNOTHERA.** — Beak long and arched, not dentated.

**GENUS III. TROCHILUS.** *Humming-birds, Colibris.*

Beak long and slender; brilliant metallic lustre of plumage.

Subgenus 1. **TROCHILUS.** — Beak arched.

2. **ORTHORHYNCHUS.** *Oiseaux mouches.* — Beak straight.

**Section 1. Tufts on the sides of the head.**

2. Stems of the first pen feathers of the wing singularly enlarged.
3. Tail forked.
4. Lateral tail pens much prolonged and enlarged at the end.
5. Tail square.

**GENUS IV. UPUPA. Hoopoes. Huppes.**

**Subgenus 1. FREGILUS. Coracias, Craves.** — Nostrils covered with feathers, directed forwards; beak longer than the head.

2. **UPUPA PROPER.** — A double row of feathers on the head raised at the will of the bird.
3. **PROMEROPS. Falcinelles.** — No tuft on the head; tail very long.
4. **EPIMACHUS. Epimaques.** — Scaly or velvet-like feathers, covering a part of the nostrils.

Nuthatches form the first genus of the family Tenuirostres (see TABLE XXV.), and use their beak as the woodpeckers do, in the manner of a pick-axe. With it they cut the bark of trees, in search of worms. They have one strong toe behind, and climb trees very dexterously. The European species, also called the Nut-jobber, lives in woods, plantations, and parks, especially where there are large forest trees. It remains in England all the winter, creeps along the trunks of trees like a mouse, feeds on the kernels of nuts, and opens the hardest and thickest shells with much noise, placing them in the crevices of bark, and striking them with all its force. It has

only one shrill note, builds its nest in the holes of trees, and, if the hole be too large, plasters it up with mud.

The Creepers are so called from their habit of climbing trees, using their tail as a support, the pen feathers of which end in a stiff point, and become much worn. That species called the Familiar Creeper is one of the smallest of British birds, and sometimes makes its nest "within the loose bark of a decayed tree."\* It is also an inhabitant of the United States, is one of the most industrious seekers of vermin; and if kept in a green-house would entirely free it from insects without injuring the plants. It works its way up a tree spirally, or like a cork-screw.

The *Melithreptus* is from the South Sea Islands, and supplies the natives with those beautiful scarlet feathers which form their head dresses, lining of cloaks, &c.

It is not in the power of words to convey an idea of the beauty of Humming Birds. Baron Cuvier says—"These little birds, so celebrated for the metallic lustre of their plumage, especially for the plates, as brilliant as precious stones, which are formed by the scaly and peculiarly constructed feathers of their head, breast, and throat, have a long, slender beak, containing a tongue which elongates almost as much as that of the Woodpecker, and which, by a similar mechanism, is divided almost to its base into two

\* Yarrell.

threads. With this they are said to suck the nectar from flowers; nevertheless, they also live on insects.

... Their little feet, their wide tail, their excessively long and narrow wings, the rapid decrease of their pens in length, their short humerus (fore arm), their large sternum without a notch, all give them a flight similar to that of swallows, and they also balance themselves in the air as easily as certain flies. It is thus that they hover with a humming noise round plants, or flowering shrubs, and in proportion, fly more rapidly than any other bird." Let all who wish to know what Humming Birds are, visit the unrivalled collection of Mr. George Loddiges, at Hackney, which is opened to the curious with a liberality only to be surpassed by the profound knowledge which the owner possesses of his treasures. All have been mounted by Mr. G. Loddiges himself, in their natural forms and attitudes, and are arranged according to their natural divisions. Some have only their breast ornamented with corslets of precious stones, others have long jewel feathers hanging from their ears; a few have diadems which a queen might vainly try to imitate, and many have head, throat, and breast covered with rubies, emeralds, and gold. Those which inhabit the more elevated, and consequently colder regions of South America, have fine white down round their tarsi, like muffettees, to keep the hands warm; and all these, with many of their exquisite nests, their young ones, scarcely larger than

flies, peeping out of them, their eggs no bigger than small peas, make this collection stand alone.

The *Fregilus*, in some of its habits, resembles crows. It lives on the high mountains of the Alps and Pyrenees; its wings are as long, or longer, than its tail, and it nests in the clefts of rocks. When it descends into the valleys it is a sign of approaching snow and bad weather.

The Hoopoes present a very remarkable appearance. One species comes to England in the summer from the northern parts of Africa, and occasionally builds its nest in this country. It frequents low, marshy grounds, where it seeks insects. Its beautiful crest is only raised when the bird is excited, and it is called Hoopoe from the low sound of hoop! hoop! which it softly utters. It rubs itself in the dust, hides the food which it does not immediately require, runs fast upon the ground, and fights fiercely

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#### GROUP II. SYNDACTYLA.

The group *Syndactyla* has the external toe nearly as long as that of the middle, and both are united as far as the last joint but one (see TABLE XXVI.).

## TABLE XXVI.

## CLASS II. AVES.

## ORDER II. PASSERES.

## Group II. SYNDACTYLA.

GENUS I. MEROPS. *Wasp-eaters, Bee-eaters, Guépriers.*

Beak elongated, triangular at its base, slightly arched, and terminated in a sharp point.

GENUS II. PRIONITES. *Bariphonus, Motmots.*

Beak much stronger than the above, edges crenulated, or with square indentations.

GENUS III. ALCEDO. *King-fishers, Martins-Pêcheurs.*

Beak long, straight, angular, and pointed; tail very short.

GENUS IV. CEYX.

No internal toe.

GENUS V. TODUS. *Todées, Todiers.*

Beak flattened horizontally, obtuse at the end.

GENUS VI. BUCEROS. *Horn-bills, Calaos.*

Enormous, dentated beak.

Section 1. Beak with projections.

2. No projections.

Bee or Wasp-eaters belong to this group, and build their nests in holes, which they make along the banks of rivers, to a depth of from four to five feet. The ancients believed that Bee-eaters took care of their parents in their old age, because the young do not

quit the old birds for a long time. The species which visits England comes from Africa, and abounds in the countries on each side of the Mediterranean, the southern parts of Russia, &c. The Cape species is called Gnat-snapper, and the Hottentots are guided by it to the holes in which the bees have deposited their honey. Mr. Yarrell accounts for the impunity with which birds swallow insects with stings, by the supposition, that the bird "pinches them, passing them from head to tail, between the points of its mandibles, till, by repeated compression, the sting is either squeezed out, or its muscular attachments so deranged, that the sting itself is harmless."

Kingfishers have shorter feet than Bee-eaters, and tongue and tail very short. They live on small fishes; which, after bruising them with the beak, they swallow head foremost; and catch, by darting on to them from the branch or rail, on which they watch for their prey. They occasionally hover over the streams near which they live; nest in holes like the bee-



eaters, and are found in almost all parts of the world. They are quarrelsome and solitary birds, store their stomachs with food, and bring it back again into their mouth when they feed their young: they also eject the bones of fishes in the same manner. It is a celebrated bird among ancient authors, under the name of Halcyon, or Alcyon, and was in their time

invested with the power of quelling storms. It was also then believed, that while the Halcyon was hatching her eggs, sailors might venture to sea without fear; hence the expression of Halcyon days. There is even now a tradition, that the dead bird, carefully balanced and suspended by a single thread, always turns its beak towards that point of the compass from which the wind blows, and allusions to this are made by Shakspeare. The Hornbills are large birds belonging to Africa and India, with enormous beaks, in size and habits resembling crows, and with feet like those of the kingfisher. Besides their unusually large beak, some of them have excrescences in the upper part of it, which vary much with age; the young birds not possessing any. The whole is cellular, or the bird would be unable to support its weight. Their tongue is small, and remains at the bottom of their throat. They feed on fruit, mice, small birds, reptiles, and dead bodies.



### ORDER III. SCANSORES.\* *Climbers.*

External toe directed backwards.

THE turning back of the outer, as well as the great toe of this order, affords them a solid support

\* From *scando*, to climb.



when ascending trees in search of food. Rigorously speaking, however, all birds contained in this division do not climb, and many do, which are referred to others: nevertheless, the formation of those termed Scansores justifies the naturalist in grouping them together (see TABLE XXVII.). They generally nest in the holes of old trees; their flight is moderate, and they eat insects or fruits according to the nature of their beak. The sternum of most has two notches behind; that of the parrots has a hole on each side, and some have the surface wholly filled up.

## TABLE XXVII.

### CLASS II. AVES.

#### ORDER III. SCANSORES. *Climbers, Grimpeurs.*

##### GENUS I. GALBULA. *Jacamar.*

Beak long, pointed, upper edge sharp; feet short; anterior toes partly united.

Section 1. Beak longer than others, perfectly straight.

2. JACAMÆBOPS. — Beak shorter than others, thicker, and a little curved; anterior toes more separate.

3. JACAMAR. *Alcyon.* — Only three toes.

##### GENUS II. PICUS. *Woodpeckers, Pics.*

Beak long, straight, and angular, compressed like a wedge at the end; tongue extensile.

Section 1. **PICOIDES.** — No external toe.

2. Beak slightly arched.

**GENUS III. YUNX.** *Torquilla, Wry-necks, Torcols.*

Beak straight, pointed, and nearly round.

Subgenus 1. **PICUMNES.** — Very short tails; only three toes.

**GENUS IV. CUCULUS.** *Cuckows, Coucous.*

Beak moderate, compressed, slightly arched; tail long.

Subgenus 1. **CUCULUS PROPER.** — Tarsi short; tail with ten pen feathers.

2. **COUAS.** *Coccyzus, Macropus.* — Tarsi long.

3. **SAUROTHERA.** — Beak long, curved only at the end.

4. **CENTROPUS.** *Corydonia, Podophilus, Coucals.* — Claw of the great toe straight and pointed, like that of larks.

5. **LEPTOSOMUS.** *Courols, Vouroudrious.* — Beak thick, pointed, straight, compressed; nostrils pierced obliquely in the middle of each side.

6. **INDICATORS.** *Honey Cuckows, Indicateurs.* — Beak short, deep, and conical.

7. **MONASA.** *Barbacous.* — Beak conical, elongated, slightly arched at the end; thread-like feathers or stiff hairs at the base.

**GENUS V. MALCOHAS.** *Phœnicophæus.*

Very thick beak, round at the base, arched at the end; a bare space round the eyes.

Section 1. Nostrils round, pierced near the base.

2. Nostrils narrow, pierced near the edge.

**GENUS VI. SCYTHOPS.** *Psittaceous Horn-Bills.*

Beak long and thick, hollowed on each side into two shallow, longitudinal furrows; nostrils round; bare space round the eye.

GENUS VII. BUCCO. *Barbets, Barbus.*

Beak conical, swelled at the sides of the base.

- Subgenus 1. *POGONIAS. Barbicans.* — One or two strong teeth on each side of the upper mandible.
2. *BUCCOS PROPER. Capito.* — Beak simply conical, slightly compressed; upper edge blunt, a little raised in the middle.
3. *TAMATIA. Chacurus.* — Beak a little elongated, and more compressed; end of the upper mandible curved downwards.

GENUS VIII. TROGON. *Couroucous.*

Beak short, wider than deep, curved from the base, upper edge arched and blunt.

GENUS IX. CROTOPHAGA. *Anis.*

Thick, compressed beak, arched, and surmounted by a vertical and sharp ridge.

GENUS X. RAMPHASTOS. *Toucans.*

Enormous beak, nearly as long as the whole body, arched towards the end.

- Subgenus 1. *TOUCANS PROPER.* — Beak wider than the head.
2. *PTEBOGLOSSUS. Aracari.* — Beak smaller than the head.

GENUS XI. PSITTACUS. *Parrots, Perroquets.*

Hard, thick, solid beak, rounded in every part, encircled at the base with a membrane in which the nostrils are pierced.

- Subgenus 1. *ARA.* — Cheeks bare; long, graduated tail.
2. *CONURUS. Perruches.* — Long tails.
- Section 1. *PERRUCHES. Aras.* — Bare space round the eye.

2. **PALÆORNIS.** *Arrow-tailed Parrakeets*. — Two middle tail pens longer than the rest.
3. **PLATYCERCUS** — Tail enlarged at the end.
4. **PARRAKEETS PROPER.** — Graduated tail.
5. Square tail.

**Subgenus 3. PLYCTOLOPHUS.** *Cockatoos, Cacatoes*. — A crest formed of long, narrow feathers.

**Section 1.** Feathers of crest wider than the rest; moderately long.

2. Hanging feathers on the head, bearded only at the end.
  3. No crest.
  4. **LORIS.** — Tail like a wedge.
  5. **PSITTACULES.** — Tail very short.
4. **MICROGLOSSUS.** *Perroquets à trompe*. — Tail short and square; crest of cockatoos; cheeks bare; upper mandible enormous, lower very short.
  5. **PEZOPORUS.** *Perruches ingambes*. — Beak more feeble; tarsi longer, and claws straighter, than others.

**GENUS XII. CORYTHAIX.** *Opæthus, Touracos*.

Beak not ascending on the forehead; short, swelled, upper mandible.

**GENUS XIII. MUSOPHAGA.** *Banana-eaters, Musophages*.

Base of the beak forming a disk which covers a part of the forehead.

Jacamars are nearly allied to Kingfishers by their feet and beak: but although their toes are partially united, they are not the same toes as those which are joined together in the Kingfishers. Their plumage

is less smooth, but has always a metallic lustre. They are solitary birds, and nest on the lower branches of trees.

The tongue of Woodpeckers is furnished at the end with spines, which curve backwards, and is pushed forwards and retracted by a peculiar construction of the tongue-bone. Their tail has ten pen feathers with stiff, elastic stems, and serves to aid them in climbing trees. They strike the bark with their beak, partly to frighten the insects from their hiding-places ; and their tongue being furnished with a clammy juice, they retain their prey from the moment they have touched it. They occasionally eat fruits, are timid and cunning, generally live alone, and when hatching, male and female take it in turns to perform the office. The commonest species in England is called the Green Woodpecker, and when once it has found its way up a tree, it is said never to descend, but to fly back to the spot at which it means to recommence its toil. When it cries loudly, rain is said to be approaching. Wilson describes their mode of making their nests as follows:—" Having pitched upon a tree, they reconnoitre it minutely for several days, and then the work is first begun by the male, who cuts a hole with his powerful bill in the solid wood, as circular as if described by a pair of compasses. He is occasionally relieved by the female, both parties working with the most indefatigable diligence. The direction of the hole, if made in the body of the tree, is generally downwards in a sloping direction for six or eight

inches, and then straight down for ten or twelve more: within, roomy, capacious, and as smooth as if polished by the cabinet-maker; but the entrance is judiciously left just so large as to admit the body of the owner. During this labour they regularly carry out the chips, often strewing them at a distance, to prevent suspicion. This operation sometimes occupies the chief part of a week. The female, before she begins to lay, often visits the place, passes out and in, examines every part, both of the exterior and interior, with great attention, as every prudent tenant of a new house ought to do, and at length takes complete possession. The eggs are generally six, pure white, and laid on the smooth bottom of the cavity."

The tongue of the Yunx is nearly as extensile as that of the Woodpeckers, but has no spines, and the tail has no stiff pens. The bird owes its English and French names to the singular habit which it possesses of twisting its head and neck with the most ridiculous contortions when alarmed, which are accompanied by a hissing noise. Because it comes and goes with the Cuckoo, it is called the Cuckoo's Maid.

Cuckoos have long been celebrated for laying their eggs in the nests of other birds who feed in the same manner; and attentive observers declare, that during the first few days of their life they turn out all other young birds and eggs from the nest; they are said to slip their beaks under their victims, elevate them, and then throw them over the side. If two cuckoos happen to be hatched together, they will fight for

possession of the nest till one be overcome. If unable to get rid of all around it, the cuckoo is restless and agitated; but after twelve days the destructive propensity seems to cease. It has been supposed that the short time which the Cuckoo stays in England makes it unable to rear its young, and it therefore deposes its parental duties to another bird.

The Indicators, well known from their love of honey, and the cries by which they entice the natives of Africa to follow them and take the bees nests, that they may have a share, have a beak almost as conical as that of the sparrow; their tail has twelve pen feathers, is forked, and at the same time graduated. Their skins, from being singularly hard, generally resist the stings of the bees, but they are sometimes so severely stung about the eyes that they die from the effects.

Trogon have tufts of beards; their little feet, covered with feathers almost to the toes, their long and wide tail, and their close, fine, and light plumage give them a peculiar appearance. A portion of their feathers always possesses a metallic lustre, and the rest is more or less brilliantly coloured. They nest in the holes of trees, feed on insects, live solitarily on the lower branches of trees in thick forests, and only fly in the morning and evening. They are common to both hemispheres; and that American species, which has a tail almost as long as its body, is a sacred bird among the Mexicans, who use its feathers for the adornment of their persons.

The large beak of the Toucans is light and cellu-

lar within, and irregularly dentated at the edges; and their long, slender tongue is furnished with beards like a feather. They are only found in the warm parts of America, where they live in small flocks, and generally feed on insects and fruits, but during the hatching season they eat the eggs and newly-born young of other birds. They throw their food into the air and catch it, in order to swallow it more conveniently. Their feet and wings are short, their tail moderately long, and they nest in trunks of trees. The breast and throat of Toucans Proper furnish the natives of Guiana with most of their ornamental feathers; and they catch these birds, pluck out the part which they require, and let them fly again. Without this contrivance, from the quantity they use, and the small portion yielded, the race would soon be destroyed.

The tongue of Parrots is thick, fleshy, and round, which facilitates their imitation of the human voice, and three muscles connected with their larynx increase this faculty. Their powerful jaws are put in motion by a greater number of muscles than those of other birds; and their food consists of all kinds of fruit. They climb trees by means of their beak and feet, nest in the holes of trees, have naturally a loud, screeching voice, and many of them possess the most splendid plumage. They abound in the torrid zone



of each hemisphere, and the species and varieties are very numerous, each island possessing its own. Their short wings do not allow them to take long flights, and they live to a great age; we even hear of their descending from one generation to another. The arrow-tailed Parrakeet, of a beautiful green, with a red ring round its neck, and a black spot upon its throat, was introduced into Europe by Alexander the Great, and bears his name. It is a docile bird, and speaks well. The author knew one which was very entertaining, and which was sent home by Mr. Alfred Duvaucel, the Indian traveller and naturalist, to his family. It repeated his name distinctly; and its morning salutation was always, "As-tu déjeuné, ma Cocotte?"\*—a strong hint to bestow something upon it, Cocotte being its own appellation. It was allowed to fly about the house, and made so good a stand against the cats, that no danger was apprehended from them. When it saw any one writing, it would fly very softly over their shoulders, draw the pen from between their fingers, and fly away with it in triumph, highly delighted if it were chased in consequence. If the ladies put on their bonnets to walk in the garden while the window was open, it instantly darted out, and waited for them, meeting them at the door, and after flying round them as they walked a short distance, returned to its perch by the same window.

Cockatoos chiefly inhabit the further parts of

\* "Hast thou breakfasted, my Cocotte?"

India, preferring marshy districts. Baron Cuvier places the common parrot in Section 3., among which the grey species is said to talk the best, and comes from equinoctial Africa. In the countries bordering the Gaboon river the natives catch them in numbers, and place them in huts, fastened by one leg to a stake in the ground, in order to await the arrival of vessels, when they barter them for articles of clothing, knives, &c. The author saw them wild in those parts; and it was very amusing to watch the monkeys run up the trees after them, leap in amongst them as they congregated upon the boughs, and pull their tails. The monkeys chattered, the parrots screamed, and the noise became almost insufferable, even when proceeding from the summit of the giant trees of that land. She sailed with three hundred of them on board the vessel in which she took her passage to England; and the instant daylight appeared, these vociferous birds began to scream with all their might. Many of them, however, died when they came into cold latitudes, and afforded food for the panther already alluded to in this work: had it not been for them the poor beast would probably have been starved, for pirates boarded the ship, and took away almost all the provisions. A remarkable instance of their memory came before the author, in a parrot belonging to a friend, who was let out of his cage one morning before the family assembled for breakfast, having urged the housemaid to indulge him. She left him at liberty, and he was found in the act of destroying a valuable book, the fragments of which

were lying round him on the hearth-rug. He was beaten, scolded, and put back into his cage, where he remained in silence all day. In the evening he expressed a wish "to go to bed," which was the signal for a thick cloth to be thrown over him; and when this was done, he was heard repeating every word of the scolding which he had received. Parrots are not capable of much affection, will occasionally bite their best friends, and are very cunning.

The principal part of the plumage in the Loris is red; they are peculiar to the East Indies, and are constantly mentioned in eastern tales. Among those called Psittacules are the Love-Birds from the western shores of Africa.

Two African genera are usually placed among the Climbers, notwithstanding the considerable analogy which they bear to the family of the Gallinaceæ. Their feet have a short membrane between the front toes, but the external toes are often directed backwards. Their nostrils are pierced in the horn of the beak, and the edges of the mandibles are dentated. The first, or the *Corythaix*, has a crest, which it raises and depresses at pleasure. The commonest species is from the Cape; its colour a beautiful green, and part of its wings crimson. It nests in the holes of trees, and eats fruit. The *Musophagæ* are so named because they feed chiefly on bananas.\* They inhabit Guinea and Senegal.

\* *Musa* is the botanical name for Banana; the rest of the word is from the Greek for, "to eat."

## ORDER IV. GALLINACEÆ.

Upper beak arched ; nostrils pierced in a membranaceous space at the base of the beak, and covered with a scale.

THE Gallinaceæ have received their name from the greater or lesser affinity which they bear to the domestic cock, the Latin name for which is Gallus. Their nostrils are pierced in a large membrane which covers the base of the beak ; their gait is heavy, their wings short, their bony sternum diminished by two notches, so wide and deep that they take away almost all the sides, and the crest or ridge of which suddenly slopes back from the front. To this the sharp point of the merrythought is only joined by a ligament ; and all these peculiarities so weaken the force of the muscles of the breast that their flight is laboured. Their larynx is very simple, and their voice far from agreeable ; their crop is very large, their gizzard possessed of much strength, and they generally have from fourteen to eighteen pens in the tail. The two foremost toes are often united at the base by a short membrane. With one exception they lay their eggs upon the ground, and hatch them upon straw rudely spread. Each male has several mates, and takes no share in the labour of hatching. The young birds are able to run at the moment of leaving the egg ; and among this order we find our game and farm-yard fowls.

The Alectors (TABLE XXVIII.) are large Galli-

naceæ of America, somewhat similar to turkeys. They have large, rounded tails composed of stiff pens; live in woods, on buds and fruits, nest in trees, roost like common fowls, and are easily domesticated.

## TABLE XXVIII.

## CLASS II. AVES.

ORDER IV. GALLINACEÆ. *Gallinæ, Rasores.*GENUS I. ALECTOR. *Carasson.*

Tail large and rounded.

- Subgenus 1. **CRAX.** *Hoccos, Mitous.* — Beak strong, the base encircled by a skin in which the nostrils are pierced; a tuft of upright feathers upon the head.
2. **OURAX.** *Pauxi.* — Beak shorter and thicker than the above; membrane at the base, and great part of the head, covered with velvet-like feathers.
3. **PENELOPE.** *Guans, Quans, Jacoos, Yacous.* — Beak thinner; a bare space round the eyes and under the throat.
4. **ORTALIDA.** *Parraquas.* — Bare space very small round the eyes.
5. **OPISTHOCOMUS.** *Hoazin, Sasa, Crested Pheasants.* — Beak short and thick; nostrils pierced in the horn; a tuft of long, narrow, fine feathers on the head; no membrane at the base of the toes.

GENUS II. PAVO. *Peacock, Paons, Polyplectrum, Diplectron.*

Tuft on the head; tectrices of the tail longer in the male than the pen feathers.

Subgenus 1. **LOPHOPHORUS.**—Egret on the head; tectrices not prolonged.

**GENUS III. MELEAGRIS.** *Turkeys, Dindons.*

Head and upper part of the neck covered with a warty skin; a fleshy appendage hanging along the neck, and another on the forehead.

**GENUS IV. NUMIDA.** *Pinta de Meleagris, Guinea-fowls, Peintades.*

Head bare; fleshy caruncles at the base of the cheeks.

**GENUS V. PHASIANUS.** *Pheasants, Faisans.*

Cheeks partly bare of feathers, and covered with red skin.

Subgenus 1. **GALLUS.** *Cock, Coqs.*—A fleshy, upright crest on the head, and fleshy caruncles on each side of the lower mandible.

2. **PHEASANTS PROPER.**—Long graduated tail; pen feathers arranged like the tiles of a roof.

3. **HOUPPIÈRES.**—Vertical tail of the cocks; tuft on the head like the peacock; strong spurs on the tarsi.

4. **TRAGOPON.**—Head nearly bare; a small slender horn behind each eye; a fleshy protuberance under the throat.

5. **CRYPTOMYX.**—Bare space round the eye; tail moderate and flat; no spurs; no claw upon the great toe.

**GENUS VI. TETRAO.** *Grouse, Tetras.*

Bare head, generally red in colour; eyebrow projecting.

Subgenus 1. **BONASA.** *Tetrao, Black-game, Wood-grouse, Capercaillie, Capercalze, Onercalze, Heath-cocks, Coqs de brayères.*—Legs covered with feathers; no spurs.

Subgenus 2. LAGOPEDES. *Perdrix de neige*. — Round or square tail.

3. GANGA. *Pterocles, Attagen*. — Pointed tail ; toes bare.
4. PARTRIDGES. *Perdrix*. — Tarsi bare as well as the toes ; beak less strong ; males with short spurs or tubercles.
5. FRANCOLINS. — Longer and stronger beak ; generally strong spurs, but legs of the partridge.
6. COTURNIX. *Quails, Cailles*. — Beak smaller than the partridge's, and more slender ; tail shorter ; no red eyebrow ; no spur.
7. COLINS. *Perdrix et Cailles d'Amérique*. — Beak shorter, thicker, more swelled ; tail more developed than above.

GENUS VII. HEMIPODIUS. *Tridactyles*.

No great toe ; beak compressed, forming a slight projection under the lower mandible.

Subgenus 1. ORTYGIS. *Turnix*. — Toes wholly separated to the base.

2. SYRRHAPTES. — Tarsi short, covered with feathers as well as the toes, which are short and partly united ; very long and pointed wings.

GENUS VIII. TINAMUS. *Crypturus, Tinamous, Ynambus*.

Long slender neck ; tarsi short ; long slender beak, end blunt, generally a small furrow on each side ; nostrils pierced in the middle ; wings short ; scarcely any tail, or none.

Subgenus 1. PEZUS. — A small tail hidden under the rump feathers.

2. TINAMUS PROPER. — No tail at all ; nostrils near the base.
3. RHYNCHOTUS. — Beak stronger, no furrow, a little arched ; nostrils pierced near the base.

GENUS IX. COLUMBA. *Pigeons.*

Beak vaulted; nostrils pierced in a large membranous space, and covered with a cartilaginous scale; no membranes between the toes.

Subgenus 1. COLUMBI. *Gallines.* — Tarsi elevated; beak slender, and more feeble than others.

2. PIGEONS PROPER. — Feet short.

3. VINAGO. *Columbars.* — Beak thick and solid, compressed at the sides; tarsi short; feet large and bordered.

Peacocks have the power of erecting the feathers of their tail, and spreading them out like a wheel; the loose and silky beards of which, and their beautiful colours, arranged like eyes, together with the brilliant hues on their head and throat, make them some of the most splendid of all birds.

Turkeys have a tuft of stiff feathers hanging from the bottom of the neck; and their tail, though shorter and less brilliant than that of the peacock, rises, and spreads in the same manner. They are originally from America, and were introduced into Europe during the sixteenth century. The wild Turkeys of Virginia are of a greenish-brown, tinged with a bright copper colour; but those of Honduras are almost as beautiful as the peacock.

Guinea-fowls have a short tail, and their skull often bears a callous crest. They have no spurs, and bear a plump look. Their incessant and wearying cry resembles the words “go back;” and they are very quarrelsome birds, originally from the western coast of Africa, where they are so numerous that, when



riding among the tall grass, the author used to be afraid of trampling upon them. A Greek fable says, that Guinea-fowls are the metamorphosed sisters of Meleagris, and the white spots on the feathers their tears. The tail pens of Cocks are upright; and the tail tectrices of the male are so prolonged as to fall over them. Their plumage and size vary to infinity; and domesticity has produced a great many changes which may be termed monstrosities, as they do not in any way belong to the original bird. A very curious circumstance in their economy is, that an aged hen often assumes the plumage of the male.

The common Pheasant was brought to Europe by the Argonauts, from the river Phasis in Colchis, and still retains traces of its eastern origin, being rather a delicate bird, and requiring great care to preserve it. It never frequents unsheltered ground, but delights in jungle and long grass. It feeds on grains, green leaves, berries, and insects. It is also very fond of the roots of a certain ranunculus. It runs very fast, and flies night and morning. The cock pheasant runs away at the approach of a dog, but the hen squats down in the grass. She often assumes the plumage of the male, and then never lays any more eggs. The Golden Pheasant is celebrated for its brilliant hues; and Baron Cuvier was of opinion that Pliny's description of the Phoenix referred to this bird. The Argus Pheasant, from southern India and Sumatra, is remarkable for the length of its tail, and the eyes and spots with which it is adorned. The tail of a Chinese species measures four feet.

The great Cock of the Woods has become a scarce bird in Great Britain. Its name of Capercaillie is derived from Capulcoille, which, in Gaelic, means "the horse of the wood," and the German appellation

"auerhahn," with the Latin specific term "urogallus," all express its size. It is extinct in Ireland; but great endeavours have been made, and are still making, by landed proprietors, to restore it to Scotland. It abounds in Norway, and particularly haunts fir woods, feeds on the leaves and young shoots of the *Pinus sylvestris*\*, birch buds, and various berries, and the young ones at first eat worms, ants, &c. They roost on trees; and when very cold bury themselves in the snow. They fly several miles at a time, live to a great age, and become quite tame, but are very bold, and attack persons as the turkey-cock does

\* Scotch fir.

Black grouse are found in England, Scotland, Holland, Lapland, Russia, Germany, France, the Alps, &c., and their flesh is by some esteemed better than that of the common grouse. The ptarmigan, red grouse, &c. all belong to this subgenus.

Instances have been known of Partridges building on low trees. Their attachment to their young amounts to a proverb; and Mr. Selby relates the following anecdote in illustration of it: — “A person engaged in a field not far from my residence, had his attention aroused by some objects on the ground, which, upon approaching, he found to be two partridges, a male and female, engaged in battle with a carrion crow; so successful, and so absorbed were they in the issue of the contest, that they actually held the crow till it was seized and taken from them. Upon search, the young birds, very lately hatched, were found concealed among the grass. It would appear, therefore, that the crow, a mortal enemy to all kinds of young game, in attempting to carry off one of these, had been attacked by the parent birds, and with this singular result.”

Quails are altogether smaller than partridges; and the common species is a heavy bird, notwithstanding which it contrives to cross the Mediterranean, and spread over Europe. It is supposed to be the same as that eaten by the Israelites in the wilderness.

The sternum of Pigeons is deeply and doubly notched; their tail possesses twelve pens; they fly far and well, nest in trees and holes, and feed their young by disgorging the seeds which have been softened in their crop.

The Columbi-Gallines live in flocks, and feed on the ground.

The Ring-Dove, Cushat or Queest, is celebrated for its attachment to its mate, was held sacred among the ancients, and has always been cherished by Christians from its having been made the symbol of divine love. It is particularly fond of turnip leaves ; and when it has fed all day upon them, its crop becomes much distended, and its flesh acquires a strong taste. The latter, however, is prevented by opening the crop, and emptying it of its contents immediately after it is killed. They approach the dwellings of man in summer, but are very shy and timid during the winter. The common Pigeon is very plentiful in Russia, where it is called God's bird, and to kill it is esteemed an act of profanation. It attaches itself strongly to the place of its abode, retires to the dove-cote early, leaves it late in the morning, and will never willingly roost in the open air.

The Carrier Pigeon is well known for its power of returning to its home from enormous distances, and its consequent usefulness as a messenger. It is carefully trained for this purpose ; and it is on record that it will travel more than seventy miles in two hours and a half. The mode in which the passenger Pigeon rests itself during its flight in large numbers is well known in America. It is in this family that Mr. Gould places the *Megapodius* and *Talegalla* of New Holland ; but Baron Cuvier gives them to the *Grallæ*, in which order there will be found a description of these extraordinary birds.

## ORDER V. GRALLÆ.

THE habits of the Grallæ\* have given them their different names, the height and nakedness of their legs enabling most of them to enter the water to a certain depth, and fish in it by means of, a beak and neck adapted to their length. Those with strong beaks live chiefly on fishes or reptiles, and those whose beaks are feeble, content themselves with worms, slugs, and insects: very few confine themselves to vegetable food, and these live at a distance from water. Generally speaking, their external toe is united at the base with that of the middle, by means of a short membrane; sometimes there are two such membranes, and occasionally both are wanting. Others have their toes bordered with a membrane in their whole length, or are palmated† to the end of their toes, or have no great toe. The exceptions to long wings and rapid flights are the Brevipennes‡ (see TABLE XXIX.), which, in some respects, strongly resemble the Gallinacæ. So large and heavy is their body that no proportionable muscles could give them the power of flying. Their sternum is made accordingly, having no ridge to sustain the pectoral muscles, and the muscles themselves

\* The Latin word for stilts.

† That is, having a membrane between each toe, converting the foot into one broad palm. The terms web and web-footed are applied to the same thing

‡ Short-winged.

are small. Their legs however make up for the deficiency in their wings, and the muscles of these parts are enormous.

## TABLE XXIX.

## CLASS II. AVES.

## ORDER V. GRALLÆ.

*Waders, Shore-Birds, Echassiers, Oiseaux de Rivage.*

- Family 1. BREVIPENNES. — Wings extremely short ; no great toe.
- Family 2. PRESSIROSTRES. — Long legs ; great toe too short to touch the ground, or none ; beak moderate.
- Family 3. CULTIROSTRES. *Ardeæ*. — Long, thick, and strong beak ; generally sharp and pointed.
- Family 4. LONGIROSTRES. *Scolopax, Tringa*. — Long, slender, feeble beak.
- Family 5. MACRODACTYLA. — Toes very long ; no membranes between them.
- Family 6. VAGINALES. — Legs short ; many have a membrane along the edges of the toes ; beak thick and conical.
- Family 7. GLAREOLA. — Beak short, conical, arched, moderately cleft ; wings long and pointed ; legs moderately long ; external toes somewhat palmated ; great toe touching the ground.
- Family 8. PHŒNICOPTERUS. *Flamingos, Flammants*. — Legs extremely long ; three toes before, palmated to the end ; one behind extremely short ; long slender beak.

## FAMILY I. BREVIPENNES.

Very short wings which aid in running, but do not enable the bird to fly.

## TABLE XXX.

## CLASS II. AVES.

## ORDER V. GRALLÆ.

## FAMILY I. BREVIPENNES.

GENUS I. STRUTHIO. *Ostriches, Autruches.*

Wings short, only used to increase the speed when running: beak horizontally flattened, moderately long, blunt at the end.

GENUS II. CASUARIUS. *Cassowaries, Casoars.*

Wings still shorter than those of the Ostrich, wholly useless in running; three toes, all furnished with nails.

The loose and flexible feathers in the wings and tails of Ostriches (see TABLE XXX.) are well known, as forming the most graceful ornamental plumes. Their tongue is short, round, and fleshy; their eyes large, and furnished with eye-lashes, and their crop is enormous.

The Ostrich of the Old World has only two toes, the external of which is half as long as the other, and has no claw. It lives on herbage and seeds, and swallows flints, pieces of iron, &c. with impunity. When pursued, it kicks stones behind it with much

force and dexterity, and no animal can match it in swiftness. They assemble in such large flocks in the sandy and arid plains of Africa and Asia, that they have frequently been mistaken for a body of cavalry. They are hunted by men on horses, and approached gradually, for if they were to take alarm, they would soon completely distance their pursuers. During the heat of the day their wings are always quivering and flapping; as if they were constantly fanning themselves. In captivity, they are very docile and obedient to those with whom they are familiar, but fierce towards strangers. There were two in the menagerie of Paris, who often fed from the hand of the author, taking indiscriminately all she offered them, and one of whom met with a cruel death. Some glaziers, when mending the skylight of their abode, dropped a triangular piece of glass, which was swallowed by the female, and which lacerated her throat so severely that she died. The male bird pined for a few weeks, and then followed his companion. Adanson, the French traveller in Senegal, mentions two ostriches which were so tame as to allow boys, and even full-grown men, to ride on their backs. Mr. Pringle, speaking of the ostrich, says, that "the hens lay all their eggs together in the same nest, each contributing from twelve to sixteen; and males and females take it in turns to hatch them; the male usually preferring the night, when his superior strength is most requisite to protect the eggs, or the newly-fledged young, from jackals, tiger-cats, and other enemies, which are said to be



not unfrequently found lying dead around the spot; slain by a stroke from the powerful foot of this gigantic bird. The nest consists merely of a hollow cavity, scooped in the ground, having the earth raised round the edges to keep the eggs in their proper position. The eggs are placed upon their points, and about thirty, at most, are hatched; though double that number are sometimes found in and around a nest. The females continue to lay during incubation, but the supernumerary eggs are placed outside the nest, being reserved for the nourishment of the birds when they first issue from their shell, and are too tender to digest the hard and acrid food on which the older ones subsist. In the middle of the day, the nest is occasionally abandoned by the old birds, the heat of the sun being then sufficient to keep the eggs at the proper temperature. An ostrich's egg is considered as equal in its contents to twenty-four of that of the domestic hen. The Hot-tentots place one end of the egg in hot ashes, make a small orifice at the other, and keep stirring the contents with a stick till they are sufficiently roasted; and thus, with a seasoning of salt and pepper, a nice omelet is produced. The Ostrich of South Africa is a wary animal; at least when it is eagerly pursued, for the sake of its valuable plumage, this bird displays no want of sagacity in providing for its own safety." If the nests have been disturbed, or the footsteps of man discovered near them, the ostrich breaks all the eggs and abandons the spot.

The Ostrich of America is about half the size of

the African ostrich, and has three toes, each provided with a claw ; its feathers are but little used, except for making brooms. It is easily tamed, and its flesh, eaten when young, is very good.

The feathers of the Cassowaries have so few beards that they resemble coarse hairs, and give the bird a very peculiar appearance. The Emu from the Indian Archipelago, is one of the species ; has a bony projection on the head, covered with a horny substance ; the head and neck naked, hanging caruncles, and some stiff stems upon the wing, which are used in fighting. Its eggs are of a beautiful green. The Cassowary of New Holland has no projection on its head, no caruncles, is more rapid in its pace than a greyhound, and its flesh is like beef.

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## FAMILY II. PRESSIROSTRES.\*

Long legs ; upper beak slightly arched ; outer toe too short to touch the ground.

The strong beak of most of the Pressirostres enables them to penetrate the ground in search of worms ; and the feebler species frequent meadows and freshly-tilled ground. Some of the strongest also eat seeds, grass, &c.

\* Squeezed or compressed beaks.

## TABLE XXXI.

## CLASS II. AVES.

## ORDER V. GRALLÆ.

## FAMILY II. PRESSIROSTRES.

GENUS I. OTIS. *Bustards, Outardes.*

Heavy gait ; beak, neck, and feet moderately long ; upper mandible slightly arched and vaulted ; toes slightly palmated ; no great toe.

GENUS II. CHARADRIUS. *Plovers, Pluviers.*

No great toe ; beak moderate, compressed, and swelled.

Subgenus 1. *ŒDICNEMUS*. — End of the beak swollen above and below ; nasal furrow extending the half of its length ; feet reticulated ; a short membrane between each of the toes.

2. *PLOVERS PROPER*. — Beak swollen only above ; nasal furrow extending two-thirds of its length.

GENUS III. VANELLUS. *Tringa. Lapwings.*

Great toe very small.

Subgenus 1. *SQUATAROLA*. *Sandpipers*. — Great toe scarcely perceptible ; nasal furrow half as long as the beak ; feet reticulated.

2. *VANELLUS PROPER*. *Pewits*. — Great toe more distinct ; nasal furrow two-thirds as long as the beak ; tarsi plated.

GENUS IV. HÆMATOPUS. *Oyster-catchers, Huitriers.*

Beak longer than above, straight, pointed, and compressed; nasal furrow very deep, half as long as the beak; legs moderately long; tarsi reticulated.

GENUS V. CURSORIUS. *Tachydromus, Coure-vite.*

Beak more slender than above, arched; no nasal furrow; wings short; legs long; only three toes.

GENUS VI. CARIAMA. *Dicholophus, Microdactylus.*

Beak longer than above, more crook'd, and cleft as far as under the eye; legs very long, toes extremely short, very little palmated.

Bustards have the heavy appearance of the Gallinacæ; their tarsi are reticulated, and their wings short; they fly little, and eat seeds, grapes, green corn, worms, insects, and even small animals. The male of the Great Bustard is the largest of European birds, where however it is less abundant than in Tartary, Lake Baïkal, Astracan, &c. Plovers proper take a wide range, and migrate in numbers. Many have quite a different plumage in summer to that which clothes them in winter. Their name is derived from the French term "Pluvier," applied to them because they are said to be more easily caught when it rains. Several species visit England, one of which is the Dottrel, and the eggs of all are considered delicacies. The eggs of the Vanelli are equal to those of the plover, and dogs are often trained to find them on the ground, where the nest is placed. They

are called Pewits, from their cry, and the French have named them "Dix-huits," for the same reason. They are often kept in gardens, because they devour worms, slugs, &c., but they are esteemed unlucky birds in Scotland, because their cries frequently attracted attention to the hiding-places of the covenants during the time of their persecution.

The beak of the *Hæmatopi* is like a wedge, and so strong that it opens oysters, and other bivalve shells, in order to feed on the animal within. Their nostrils are pierced like a crack in the middle of the nasal furrow, and they have only three toes. They abound in Great Britain and Ireland, especially on the shores of Lincolnshire. They, however, occasionally come inland, and are found in the north and south of Europe, Japan, Brazil, &c.

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### FAMILY III. CULTIROSTRES.\*

Beak long, thick, and strong, often sharp and pointed.

The first tribe of the *Cultirostres* (see TABLE XXXII.) is formed of only one great genus; the legs of which are plated, toes moderate, those inside but little webbed, and almost all have a part of the head and neck bare of feathers. They feed chiefly upon vegetables, and have a muscular gizzard.

\* Beaks like a ploughshare.

## TABLE XXXII

## CLASS II. AVES.

## ORDER V. GRALLÆ.

## FAMILY III. CULTIROSTRES.

## Tribe 1. CRANES.

GENUS I. GRUS. *Cranes, Grues.*

Beak straight, not much cleft; nasal furrow wide and concave, half as long as the beak; great toe scarcely touching the ground; more or less of the head and neck bare.

- Subgenus 1. PSOPHIA. *Trumpeters, Agamis.* — Beak shorter than above; head and neck only covered with down; bare round the eye.
2. CRANES PROPER. — Beak as long, and longer than the head.
3. EURYPYGA. — Beak more slender than above, cleft to below the eyes.

## Tribe 2. HERONS.

GENUS I. CANCROMA. *Boot-bills, Savacous.*

Beak resembling spoons joined by their concave sides; the upper mandible with a sharp tooth on each side of the point; nostrils pierced at the base, prolonged into two parallel furrows towards the point.

GENUS II. ARDEA. *Hérons.*

Beak cleft to below the eyes; a small nasal furrow nearly reaching to the point; a sharp, dentated edge on the inner side of the middle claw.

- Section 1. HERONS PROPER. — Very thin neck, furnished at the base with long hanging feathers.
2. CRABIERS. — Feet short, very small in size.
3. ONORES. — Size of Herons proper, and colour of Butors.
4. EGRETS. — Feathers at the lower part of the back singularly long and fine.
5. BUTORS. — Feathers of the neck loose and far apart, tawny yellow in colour, spotted with black; beak and feet greenish.
6. BIHOREAUX. — Slender feathers inserted at the back of the head.

### Tribe 3. STORKS.

#### GENUS I. CICONIA. *Storks, Cicognes.*

Beak thick, moderately cleft; nostrils pierced towards the base of the beak; front toes palmated at the base.

#### GENUS II. NYCTERIA. *Jabiru.*

Beak slightly curved in the upper part.

#### GENUS III. SCOPUS. *Umbres, Ombrettes.*

Beak compressed, the sharp edge of which swells towards the base, a nasal furrow running parallel to the edge; end a little crook'd.

#### GENUS IV. ANASTOMUS. *Hians, Open-beaks.*

The two mandibles of the beak only joining at the base and point.

Subgenus 1. DROMAS. *Dromes.* — Beak compressed, a little swollen at the base below the oval nostrils.

#### GENUS V. TANTALUS. *Tantales.*

Back of the beak rounded, point curved, and slightly notched on each side.

GENUS VI. PLATALEA. *Spoonbills, Spatules, Pallettes.*

Beak long, flat, broad like a spatula, ending in a round disk two slight furrows from the base to the end.

The Trumpeters are so named because they utter a deep, hollow sound; they fly badly, but run fast; they are grateful, affectionate birds, originally from South America, and guide other birds domesticated with them. The Royal, or Crown Crane, is a most beautiful bird, uniting elegance of form and graceful carriage with fine plumage. It has a large tuft of stiff yellow feathers on its head, and also utters a trumpet-like noise. It is from the western coast of Africa, where it feeds chiefly on seeds and small fishes. Two of these cranes were kept in an aviary in England, and after some time, one of them died; the other pined, and was apparently following his companion, when a mirror was put into his cage. He advanced, in the reflection of his own image saw his companion, daily strutted backwards and forwards before it, making various gestures, and completely recovered his health. The affected and singular gestures of the Demoiselles are very ludicrous; they dance sometimes upon one leg, sometimes a little way up in the air, their heads on one side, and seemingly beating time with their beaks.

The beak of the Cancromæ may be compared to that of a Heron when crushed. Their feet have four toes, all of which are long, and have scarcely any membranes between them. They station themselves on trees, by the sides of the rivers of South America,



whence they dart upon the fishes which form their food. Their gait is, at times, grave and mournful. The legs of Herons are plated, their toes long, the external membrane very distinct, and their eyes are placed in a bare skin, which extends as far as the beak. They are melancholy birds, and nest and perch on the borders of rivers, where they feed upon fishes. Some herons have a very slender neck, with a plume of fine hanging feathers at the base. In former years they were considered as royal game, but are not now preserved. They only congregate in numbers during the spring, when they build on high trees. Besides fishes, they occasionally eat reptiles, and other small animals, and generally seek their prey morning and evening. The Buff-backed Heron is the Batty bird of India. The Bittern has been more rare in the British dominions since land has been more cultivated, and marshes drained; it feeds at night, and remains all day with its beak pointing upwards, in reeds and flags, but in France it is found in woods. It generally makes a loud, booming noise, but when alarmed utters a sharp cry. Mr. Maxwell, thus relates his capture of a Bittern in Ireland, as cited by Mr. Yarrell. "In the most impassable section of the morass, old York (the dog), pointed

with more than customary steadiness; and, it might be fancy, actually looked round with peculiar expression, as if he would intimate that no common customer was before him. I got within twenty yards, and encouraged the old setter to go in; but he turned his grizzled and intelligent eyes to mine, and wagged his tail as if he would have said, 'You don't know what I have here.' A tuft of earth flung by one of the aides-de-camp, obliged the skulker to get up, and to our general surprise, a fine Bittern rose. I knocked him over; but though he came down with a broken wing, and wounded leg, he kept the old dog at bay until my companion floundered through the swamp and secured him." Bitterns are found in most parts of the Old World, and one species in America; where, according to Mr. Audubon, it is made into soup.

Storks migrate from Africa to northern Europe during the summer, and return to the same nests for years, which are frequently on house and chimney tops. They are so cherished by the inhabitants of some parts of Germany, and thought to bring so much good luck with them, that boxes are put on the roofs of houses to induce them to build there. Various mysterious actions, which cannot be satisfactorily accounted for, are referred to the Stork, till it plays an important part in domestic history,

especially with children. It shakes and beats its prey before swallowing it. One species has an appendage in the middle of its neck like a large sausage, and from under its wings are taken those light elegant feathers, called Marabouts. This name has been given to the bird itself, on account of the extreme solemnity of its gait and manner, which associates it with that of the Mahommedan Priest or Marabout. They were also called Adjutant Birds by the late Duchess of York. Any attempt to disturb them from the extreme gravity of their deportment, causes movements which are highly diverting. The author has seen three of them take their station at Bathurst (on the Gambia) close by the river side, on the keel of an old boat turned upside down, and the position of each was every evening the same. All attempts to dislodge them were vain, till the annoyance of a terrier dog was suggested. Even he was unheeded for some minutes; their eyes followed him, but their bodies were as tranquil as if buried in slumber; at length all three rose at once, and hopping about most violently on their long thin legs, flapping their short wings, and running at the dog (who always evaded them) with their great beaks, presented a droll spectacle. They used to range through the garden and yard of the Government House, thrust their beaks through the verandah, and stand there till fed.

Jabirus have a moderately-cleft beak, and their nostrils, reticulated tarsi, and webbed feet, resemble those of the Stork. Mr. Schomburghk, in his travels

in Guiana, mentions a remarkable basaltic column, rising to a height of fifty feet from a mass of low rocks, and in this a Jabiru had built her nest. While he stood watching and admiring it, a native, unperceived, fired his (Mr. Schomburghk's) rifle, and brought nest and young to the ground. The nostrils of the Spoon-bill are oval, and they in many respects resemble Storks, but their beak is not so forcible. They eat small fishes and aquatic insects, which they find in mud. The white Spoon-bill has no voice, and when arrived at maturity, its windpipe is twisted like the figure 8.

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#### FAMILY IV. LONGIROSTRES.\*

Beak long, thin, and feeble.

The Longirostres form a numerous family, and were by naturalists scattered through many others. In a subgenus are the various species of Ibis, one of which is that sacred bird of the Egyptians to which temples were dedicated, and which was embalmed after death. The causes of this veneration are said to be, its propensity for devouring serpents, an affinity between its plumage and one of the changes of the moon; and, lastly, because its appearance announced the rise of the Nile. It is found in every part of Africa, but the scarlet Ibis is from the marshy lands, at the mouth of American rivers.

\* Long beaks.

## TABLE XXXIII.

## CLASS II. AVES.

## ORDER V. GRALLÆ.

## FAMILY IV. LONGIROSTRES.

GENUS I. SCOLOPAX. *Woodcock, Bécasse.*

- Subgenus 1. IBIS. — Beak thick, arched, nearly square at the base; nostrils pierced in a nasal furrow which reaches to the end; part of the head or neck always bare; outer toes palmated at the base; great toe long enough to touch the ground.
2. NUMENIUS. *Crescent Beaks, Curlews, Courlis.* — Beak arched, round; the upper mandible longer than the lower.
3. RUSTICULA. *Macroramphus, Scolopax proper, Woodcocks, Snipes.* — Beak straight; nasal furrow reaching to the end; upper mandible swollen at the end, so as to be wider than the lower, in which there is a furrow.
4. RHYNCHÆA. — Each mandible slightly arched at the end; nasal furrow reaching to the end.
5. LIMOSA. *Limicula, God-wits, Barges.* — Beak straight, or slightly arched above, longer than that of woodcocks; extremity a little flattened and blunt.
6. CALIDRIS. *Tringa, Sand-pipers, Knots, Mau-bèches.* — Beak flattened at the end, not longer than the head; nasal furrow long.
7. ARENARIA. *Calidris, Curwillets, Sanderlings.* — No great toe.

- Subgenus 8. **PELIDNA.** *Purres, Stints, Sea-larks, Alouettes de Mer.* — Beak a little longer than the head; no webs.
9. **COCORLI.** — Beak a little arched; the characters as above.
10. **FALCINELLUS.** *Erolia.* — Beak still more arched; no great toe.
11. **MACHETES.** *Ruffs and Reeves, Combattants.* — Beak and gait of *Calidris*; the external toes webbed.
12. **EURINORHYNCHUS,** *Eurinorinque.* — Beak flattened, wide at the end.
13. **PHALAROPUS.** *Crymophile.* — Beak flattened, the same furrows and proportions as the *Calidris*; feet and toes edged with very large membranes.
14. **STREPSILUS.** *Arenaria, Turn-stones, Sea-Dot-trels, Tourne-pierres.* — No webs; beak short, conical, pointed; nasal furrow half its length.
15. **TOTANUS.** *Snipes, Sand-pipers, Horsemen, Chevaliers.* — Beak slender, round, pointed; nasal furrows half its length; upper mandible a little arched towards the end.
16. **LOBIPES.** *Holopodius, Feet of Phalaropus.* — Beak of *Totanus*.
17. **HIMANTOPUS.** *Macrotarsus, Long-legged Plovers, Echasses.* — Beak round, slender, and pointed; legs excessively long; no great toes.

GENUS II. **RECURVIROSTRA.** *Avosets, Avocettes.*

Feet palmated nearly to the end of the toes; tarsi long; legs half bare; beak long, slender, pointed, smooth and elastic, curving upwards.

The Curlew is a bird of frequent occurrence in England, along the coast, but it forms its nest and rears its young inland. It comes from the East Indies, China, Africa, &c., and one species bears the name of Whimbrel. The end of the Woodcock's beak is soft and sensitive, and becomes pointed after death. Their feet are not webbed, their head is compressed, and their large eyes are placed so far back as to give them a stupid look, which is not contradicted by their habits. A few stay in England and Scotland all the year round, but the greater number go away in March, and return in October, preferring hazy weather for their migrations to more northern countries, on which occasions the females go first. They abound in Ireland, feed at night on earth worms, in search of which they dip their long beak into the mud, and when they have caught the worm raise it in the air, and let it slip down their throat. They have been known to weigh twenty-seven ounces, and the estimation in which they are held for the table makes them an object for the sportsman. Ruffs are rather scarce in England, and are called *Machetes*\* by Baron Cuvier, on account of their pugnacious propensities. They only come in the summer, and especially frequent the fens of Lincolnshire, Norfolk, and Cambridgeshire. They are so quarrelsome, that when in captivity they must be fed separately, and fight like game cocks; the males assembling on small hillocks raised above the swamp

\* A Greek word for fighter.

in which they live, and disputing for their mates. The ruff round their neck falls off at the end of June, and does not reappear till the ensuing spring. The Reeves, or females, have none, and no two have this ornament alike. Their feet are half webbed and yellow, and they have a peculiar, jerking motion when they move upon the ground. Their nest is generally built upon a little mound of earth, and formed of grass; they feed on insects and worms, go as far north as Scotland, and visit the Mediterranean, Caucasus, &c.

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#### FAMILY V. MACRODACTYLA.\*

Toes very long, no membranes between them.

The long feet and legs of the *Macrodactyla* are admirably adapted for walking in the long grass of marshes, and this and the membranous edges to the toes, which most of them possess, equally adapt them

\* Long-toed.



for swimming. (See TABLE XXXIV.) Their beak is more or less compressed at the sides; their body looks as if it were squeezed together; their sternum is narrow; their wings moderate, or even short; their flight feeble, and all have a moderately long great toe.

## TABLE XXXIV.

## CLASS II. AVES.

## ORDER V. GRALLÆ.

## FAMILY V. MACRODACTYLA.

Tribe 1. With spurs on the wings.

Tribe 2. Without spurs on the wings.

## Tribe 1.

GENUS I. PARRA. *Jacana*.

Four very long toes, not united by a membrane; claws, especially that of the great toe, very long and pointed; wing armed with a spur.

GENUS II. PALAMEDEA. *Screamers, Climbers, Kamichi*.

Two strong spurs on each wing; long toes and claws, that of the great toe straight; beak but little cleft, compressed, and the upper mandible slightly arched.

Subgenus 1. CHAÏA. *Chauna, Opistolophus*. — Crest at the back of the head; head and neck covered with down only; legs scarcely naked.

2. MEGAPODIUS. — Beak vaulted, a little compressed; membranous nostrils occupying nearly half of it; long and strong legs; long

plated toes terminated by large claws, somewhat flattened; a bare space round the eye; a small tubercle on the wing.

### Tribe 2.

#### GENUS I. RALLUS. *Rails, Rales.*

Beaks of different proportions.

Subgenus 1. RALLUS PROPER. — Beak longer than others.

2. CRAX. — Beak shorter.

#### GENUS II. FULICA.

Beak prolonged into a plate which more or less covers the forehead.

Subgenus 1. GALLINULUS. *Water-fowls, Poules d'eau.* —  
Border of the toes narrow; toes very long.

2. PORPHYRIO. *Sultans, Talèves.* — Beak deep in proportion to its length; toes very long, no border to them; frontal plate large.

3. FULICA PROPER. *Coots, Foulques, Morelles.* —  
Beak short; frontal plate large; toes with a festooned border.

The Screamers present a very remarkable appearance, from having a long, thin, and moveable horn, which rises from the summit of the head. They inhabit the inundated grounds of South America, have a strong voice, and feed on aquatic seeds and plants. The Chaïa, instead of a horn, raises its crest of feathers at pleasure. The Indians of Carthagena always rear some of them with their geese and fowls, because they are so courageous that they will protect other birds, even from a vulture. Their whole skin, even that of their legs, is swelled; the air lodges under it

and makes a crackling noise when pressed with the fingers.

The *Megapodius* and *Talegalla* of New Holland, already mentioned among the Gallinacæ, are supposed by Mr. Gould as likely to form a distinct family. Their tail is short, as is also the web between their toes: it is longest between the middle and internal toes. They raise mounds of sand or earth, in which they deposit their eggs, and form them by grasping a portion of the soil with one foot, and throwing it behind them till they accumulate to a proper height. In these they place their eggs, six feet deep from the summit, and two or three from the side, in an oblique direction; one in each hole, and then cover them with soil. When all are laid, the top of the cone is smoothed or rounded. Speaking of the *Megapodius*, or Jungle Fowl, Mr. Gilbert says (as quoted by Mr. Gould), that he "excavated one mound which was fifteen feet high, and sixty in circumference at the base, composed of the richest description of light, vegetable mould. He first obtained an egg at the depth of five feet in a perpendicular position, the earth lightly touching it, and the mound quite warm to the hands. Only one pair of birds is ever seen at one time near the mound, and the eggs are said to be deposited at intervals of several days." The Jungle Fowl is almost exclusively confined to the dense thickets immediately adjacent to the sea-beach, and never goes far inland, except by the banks of creeks, and then in pairs, or alone. It feeds on roots, seeds, berries and insects, particularly large beetles. Its

flight is heavy, and when first disturbed, it invariably flies to a tree, and on alighting stretches out its neck in a straight line with its body, remaining motionless in this position. If, however, completely alarmed, it takes a horizontal, but laborious flight for about a hundred yards, with its legs hanging down as if broken. The natives say that it clucks like a fowl, and screams like a peacock. The Talegalla, which has been called the New Holland Vulture\*, and congregates in small numbers, runs fast, and leaps from bough to bough of a tree when disturbed. It forms a mound of decaying vegetable matter, which is collected for several weeks previous to laying the eggs, is pyramidal in form, and the work of several pairs. The same mound is resorted to for several years, the birds adding fresh materials at every fresh laying. The eggs are placed from nine to twelve inches from each other, with the largest end upwards, are of considerable size, and one mound will contain a bushel of eggs. It is not ascertained whether the female uncovers the eggs from time to time, or whether the young bird forces its way out for itself.

The Rails present many differences in their beaks ; Landrails have them shorter than the head, and visit England in the summer, where they are found in marshy meadows, concealed in the long grass near rivers, in the midst of reeds, or in fields of green corn, from which, and their harsh cry, they are often

\* Mr. Gould has given beautiful figures of these birds in his noble work on the birds of Australia, and has kindly allowed the author to copy his descriptions.

called corn-crakes. They feed on worms, insects, slugs, and certain seeds. An anecdote is told by Mr. Jesse which may remind the reader of one already mentioned in this work, proving that the same sort of stratagem is not confined to one class of animals: — “A gentleman had a corn-crake brought to him by his dog, to all appearance quite dead. As it lay on the ground he turned it over with his foot, and was convinced that it was dead. Standing by, however, in silence, he suddenly saw it open an eye. He then took it up; its head fell, its legs hung loose, and it appeared again quite dead. He then put it in his pocket, and before long felt it all alive and struggling to escape. He then took it out, when it was as lifeless as before. Having laid it again upon the ground and retired to some distance, the bird in about five minutes warily raised its head, looked round, and decamped at full speed.”

Many of the English water fowls belong to the genus *Fulica*; for instance, the Moor Hen, which frequents ponds, rivers, &c. feeding on aquatic plants, fishes, insects, worms, slugs, &c. It flies with the legs hanging, and forms its nest among reeds. It is an inhabitant of middle and southern Europe, the Cape, Madeira, and the countries in the vicinity of the Black and Caspian Seas. Mr. Selby tells the following anecdote of it: — “During the early part of the summer of 1835, a pair of Water Hens built their nest by the margin of the ornamental pond at Bell’s Hill, a piece of water of considerable extent, and ordinarily fed by a spring from the height above, but

into which the contents of another large pond can occasionally be admitted. This was done while the female was sitting; and, as the nest had been built when the water level stood low, the sudden influx of this large body of water from the second pond caused a rise of several inches, so as to threaten the speedy immersion, and consequent destruction, of the eggs. This the birds seem to have been aware of, and immediately took precautions against so imminent a danger; for when the gardener, upon whose veracity I can rely, seeing the sudden rise of the water, went to look after the nest, expecting to find it covered and the eggs destroyed, or at least forsaken by the hen, he observed, while at a distance, both birds busily engaged about the brink where the nest was placed; and, when near enough, he clearly perceived that they were adding, with all possible dispatch, fresh materials, to raise the fabric beyond the level of the pond, and that the eggs had, by some means, been removed from the nest by the birds, and were then deposited upon the grass, about a foot or more from the margin of the pond." The nest increased in height, and the eggs were replaced, for in less than an hour the hen was quietly sitting upon them.

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FAMILIES VI. VAGINALES, VII. GLAREOLA,  
VIII. PHENICOPTERUS.

Each of the genera hitherto grouped into the sixth family of Grallæ will probably form the type of a

distinct family, and are therefore divided in the present work. (See the following TABLE.)

### TABLE XXXV.

## CLASS II. AVES.

### ORDER V. GRALLÆ.

#### FAMILY VI. VAGINALES.

##### GENUS I. CHIONIS. *Vaginalis*.

Tarsi plated; legs short; beak thick and conical, the base enveloped in a hard substance.

#### FAMILY VII. GLAREOLA.

##### GENUS I. GLAREOLA. *Giaroles, Perdrix de mer*.

Beak short, conical, arched, somewhat cleft; wings very long and pointed; tail often forked; legs moderately long; tarsi plated; external toes a little palmated; great toe touches the ground.

#### FAMILY VIII. PHŒNICOPTERUS.

##### GENUS I. PHŒNICOPTERUS. *Flamingo, Flammants*.

Neck slender, and as long as legs; head small; lower mandible oval, bent longitudinally into a semi-cylindrical furrow; upper mandible long and flat, bent transversally in the middle, so as exactly to fit the lower.

The Vaginales come from New Holland, and the only known species is perfectly white, and the size of a partridge. It lives by the side of the sea on the dead bodies which are thrown up by the tide.

The Glareola flies like a swallow, assembles in

large, screaming flocks by the water's edge, where it feeds on worms and aquatic insects. One species is found in the north of Europe.

The Flamingoes appear to be apart from all other birds. Their legs are excessively long, their three front toes webbed to the end, their hind toe very short; a membranous furrow occupies almost all that part which lies behind the transversal fold, and the nostrils themselves are like a crack. The edges of the mandibles are furnished with very fine, transversal plates, and their tongue is very fleshy. They feed on mollusca, insects, and the spawn of fishes, which they take from the water by means of their long necks; and by turning their heads they are enabled to use their crooked upper mandible. They raise a high nest in marshes, and are said to sit astride upon it when they hatch their eggs. The common species stands three or four feet high, and, as they place themselves in long lines by the shore, look like a file of soldiers. They sometimes come to the south of France, and even as far north as the Rhine, and frequent both hemispheres.



## ORDER VI. PALMIPEDES.

Legs placed very far back ; three front toes palmated to the end ; hind toe very short.

THE feet of the Palmipedes are made for swimming ; their tarsi short and compressed, and a close shining plumage, imbued with an oily juice, furnished with a thick down between the stems, and fitting closely to the skin, defends them from the water in which they live. The length of their necks admirably fits them for seeking their food in deep water as they swim upon its surface. Their sternum is very long and gives additional protection to the intestines, and their gizzard is generally very muscular. (See TABLE XXXVI.)

## TABLE XXXVI.

## CLASS II. AVES.

## ORDER VI. PALMIPEDES.

- Family 1. BRACHYPTERUS. *Divers, Plongeurs*. — Legs placed further back than those of all other birds ; wings very short ; plumage thick and close.
- Family 2. LONGIPENNES. *Grands Voiliers*. — Wings very long ; great toe free, or none ; beak not dentated.
- Family 3. TOTIPALMES. — Great toe united to the others by

\* Web-footed.

the same membrane as the rest; feet short; wings long.

Family 4. LAMELLIROSTRES. — Beak thick, covered with a soft skin; edges with fine plates or small teeth; wings moderate.

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### FAMILY I. DIVERS or BRACHYPTERÆ.

Legs placed further back than any other birds; wings very short.

Divers bear some external resemblance to the Water Hens among the Grallæ. The backward position of their legs causes them to walk with difficulty, and obliges them always to remain upright when not in the water. Most of them fly badly, or not at all, and their short wings aid them in swimming, so that they may be compared to fins. (See TABLE XXXVII.)

## TABLE XXXVII.

### CLASS II. AVES.

#### ORDER VI. PALMIPEDES.

##### FAMILY I. BRACHYPTERUS.

GENUS I. COLYMBUS. *Divers, Plongeurs.*

Beak smooth, straight, compressed, and pointed; linear nostrils.

Subgenus 1. PODICEPS. *Colymbus, Grèbes, Grèbes.* — Toes enlarged, and only united by a membrane at

the base; middle claw flattened; tarsi compressed.

Subgenus 2. **HELICORNIS.** *Podoa, Grèbifoulques.*—Tail more developed than in others; claws sharper; feet of Rails and Grebes.

3. **MERGUS.** *Colymbus Proper, Divers, Eudytes.*—Foremost toes united to the ends by membranes; pointed claws.

4. **URIA.** *Guillemots.*—Feathers of the head coming as far as the nostril; beak arched at the point, and with a notch; no great toe; wings extremely short.

5. **CEPHUS.** *Mergulus, Greenland Pigeons.*—Beak short; back of it arched, no notch.

#### GENUS II. **ALCA.** *Penguins, Pingouins.*

Beak much compressed, vertically raised and sharp on the back; feet entirely webbed; no great toe.

Subgenus 1. **FRATERCULA.** *Mormon, Auks, Macareux.*—Beak shorter than the head, as deep, or deeper than long at the base.

2. **ALCA.** *Penguins Proper.*—Beak longer than others, like the blade of a knife; wings so small as to preclude flying.

#### GENUS III. **APTENODYTES.** *Patagonian Penguins, Manchots.*

Wings with only vestiges of feathers; tarsi enlarged like the sole of the foot; great toe directed inwards; three foremost toes united by membrane.

Subgenus 1. **APTENODYTES.** *Manchots Proper.*—Beak slender, long, and pointed; upper mandible a little arched towards the end, covered with feathers for one third of its length.

2. **CATABRHACTES.** *Gorfous.*—Beak strong, com-

pressed, pointed, rounded on the back, point a little arched.

Subgenus 3. *SPHENISCUS*. *Sphenisques*. — Beak compressed, straight, irregularly furrowed at the base; end of upper mandible crook'd; superior mandible truncated, or suddenly ended.

The appearance of Divers Proper resembles that of the Grebes, but they have the usual webbed feet of the order. They are northern birds, but visit the south in the winter. Montague says that, "A northern Diver, taken alive, was kept in a pond for some months, which gave us an opportunity of attending to its manners. In a few days it became extremely docile, would come when called from one side of the pond to the other, and would take food from the hand. The bird had received an injury in the head, which had deprived one eye of its sight, and the other was a little impaired; but, notwithstanding, it could, by incessantly diving, discover all the fish that was thrown into the pond. In defect of fish, it would eat flesh. It is observable that the legs of this bird are so constructed, and so situated, as to render it incapable of walking upon them. When it quitted the water it shoved its body along upon the ground like a seal, by jerks, rubbing the breast against the ground, and returned to the water in a similar manner."

The common Guillemot of England, called Willock or Tinkershire, also bears the name of foolish Guillemot.

It is found on the coast all the year round, and thousands of them frequent the rocks by the sea-shore. They lay and hatch but one egg at a time, on the bare rock, without any nest. Mr. Waterton says, that, according to the report of the Flamborough people, when the young Guillemot gets to a certain size, it climbs on to the back of the old bird, who conveys it to the ocean; he adds, "having carried a good telescope with me, through it I saw numbers of young Guillemots diving and sporting in the sea, quite unable to fly; and I observed others on the ledges of the rocks, as I went down among them, in such situations that, had they attempted to fall into the waves beneath, they would have been killed by striking against the projecting points of the intervening sharp and rugged rocks; wherefore I concluded that the information of the rock-climbers was to be depended upon." The eggs of the Guillemots and Razor-bills form a considerable traffic from Old May-day till about the middle of June. According to the same authority, "the usual process of seeking for the eggs is generally carried on by three men, though two will suffice in case of necessity. Having provided themselves with two ropes of sufficient length and strength, they drive an iron bar into the ground, about six inches deep, in the table land at the top of the precipice. To this bar is fastened the thickest of the two ropes, and then it is thrown down the rocks. He who is to descend puts his legs through a pair of hempen braces, which meet round his middle, and there form a waistband. At each end of this waist-

band is a loop-hole, through which they reeve that of smaller size. Sometimes an iron hook and eye are used in lieu of this rope. A man now holds the rope firmly in his hand, and gradually lowers his comrade down the precipice. While he is descending he has hold of the other rope which was fastened to the iron bar, and with this assistance he passes from ledge to ledge, and from rock to rock, picking up the eggs of the Guillemot, and putting them into two bags, which he had slung across his shoulders ere he commenced his arduous undertaking. When he has filled these bags with eggs, he jerks the rope, and the motion informs his friend at the top that it is now time to draw him up. . . . . The rocks are searched for eggs every third day, provided the weather be fair. It requires considerable address on the part of the descending climber to save himself from being hit by fragments of the rock, which are broken off by the rope coming in contact with them. He avoids the danger by moving sideways when the stone is falling, and by taking care, as he goes down, to clear away with his foot any portions of the rock that seem ready to give way. . . . . As I was lowered down, the grandeur and sublimity of the scene beggared all description, and amply repaid any little unpleasant sensations which arose on the score of danger. The sea was roaring at the base of this stupendous wall of rocks; thousands and tens of thousands of wild-fowl were in an instant on the wing; the Kittiwakes\* and Jackdaws rose in circling

\* A species of Gull.

flight, while most of the Guillemots, Razor-bills, and Puffins left the ledges of the rocks in a straight and downward line, with a peculiarly quick motion of the pinions, till they plunged into the ocean. . . . The nests of the Kittiwakes were close to each other on every part of the rocks which was capable of holding them; and they were so numerous as totally to defy any attempt to count them. On the base and level ledge of the rocks, often not more than six inches wide, lay the eggs of the Guillemots; some were placed parallel with the range of the shelf, others nearly so, and others with their blunt and sharp ends indiscriminately pointing to the sea. By no glutinous matter, nor any foreign body whatever, were they affixed to the rock: bare they lay, and unattached, as on the palm of my outstretched hand. . . . . The eggs vary in size, shape, and colour, beyond all belief. . . . . The rock-climbers assure you that the Guillemot, when undisturbed, never lays more than one egg; but that, if it be taken away, she will lay another, and, if she be plundered of that, she will then produce a third, and so on."

The beak of the Penguins is generally furrowed transversely, and has a folded skin at the base. The nostrils, placed near the edges, look like narrow cracks. They live on the sea, and nest on rocks. The Great Auk is a rare visitor from the North to the British islands: it swims with extraordinary swiftness, and is supposed to live entirely on fishes. Penguins Proper have feathers at the base of the beak, which come as far as the nostrils. The feathers on the wings of the

Aptenodytes resemble scales ; their legs are placed more backward than those of any other bird ; and in order to support the body, the tarsi lie upon the ground, and are furnished with three small bones joined together at the ends. They are found in the Antarctic seas, and nest on land, to which nests they drag themselves along upon their bellies like the Divers. The species called Patagonian Penguin assembles in large flocks in the Straits of Magellan and New Guinea. Its flesh, though black, is eatable.

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FAMILY II. LONGIPENNES.\*

Great toe free, or none ; wings very long ; beak crook'd at the end, or simply pointed.

TABLE XXXVIII.

CLASS II. AVES.

ORDER VI. PALMIPEDES.

FAMILY II. LONGIPENNES.

GENUS I. PROCELLARIA. *Petrels.*

Beak crook'd at the end, looking like a piece jointed on to the rest ; nostrils united in a tube, which lies on the back of the upper mandible ; a claw upon the heel in place of a great toe.

\* Long wings.



Subgenus 1. **PROCELLARIA PROPER.** — Lower mandible truncated.

Section 1. **THALASSIDROMA.** *Tempest-birds.* — Beak shorter, legs longer, than the above ; black plumage.

2. **PUFFINUS.** *Puffins, Sea-parrots, Coulternebs.* — End of lower mandible curving downwards with that of the upper ; nostrils opening in two distinct orifices.

3. **HALODROMA.** *Pélécánoides.* — Beak of Puffins ; a dilatable throat ; no great toe.

4. **PACHYPTILA.** *Priops.* — Beak enlarged at the base, its internal edges furnished inside with vertical, pointed, and very fine plates ; nostrils separate.

## GENUS II. DIOMEDEA. *Albatross.*

Beak large, strong and sharp, terminated by a large hook ; nostrils like short rolls, lying on the side of the beak.

## GENUS III. LARUS. *Gull, Goelands, Mauves, Mouettes.*

Beak long, compressed, pointed ; upper mandible arched towards the end ; lower forming a projecting angle underneath, great toe short.

Subgenus 1. **GULLS PROPER.** — Larger than Ducks.

2. **SEA-MEWS.** *Mauves, or Mouettes Proper.* — Small species.

3. **LESTRIS.** *Labbes, Stercoraires.* — Membranous nostrils ; pointed tail.

## GENUS IV. STERNA. *Sea Swallows, Teras, Hirondelles de Mer.*

Excessively long and pointed wings ; tail forked ; feet short ; beak pointed, compressed, straight ; membranes which unite the toes much notched.

Subgenus 1. **NODDIES.** *Noddis.* — Tail not forked, and as long as the wings.

**GENUS V. RHYNCHOPS.** *Cut-waters, Skimmers, Coupeurs d'Eau, Becs en Ciseaux.*

Upper mandible of beak much shorter than the other; both much flattened.

The family of the Longipennes is spread all over the globe, and from their powers of flight, they are found by mariners in all parts of the ocean. Petrels are of all others most frequent, and from their often taking refuge on the spars of vessels during storms, are called Tempest-birds. They bear the name of Petrels, or Little Peters, because they walk on the water by the aid of their wings. They make their nests in the holes of rocks, and when attacked throw out an oily juice upon their enemies, of which they always have a provision in their stomachs. The Fulmar Petrel has a very disagreeable smell, but is precious to the inhabitants of St. Kilda on account of its oil. Portions of the horny mandibles of Sepiæ\* have been found in its stomach. It accompanies the whale-fishers, watching eagerly for whatever may be thrown overboard, and is particularly anxious to obtain the fat of the whale. It rests on the surface of the water during the most violent storms, and Captain Scoresby says, that "they occupy the greasy track of the ship; and, being audaciously greedy, fearlessly

\* Cuttle-fishes.

advance within a few yards of the men employed in cutting up the whale. It is highly amusing to see the voracity with which they seize the pieces of fat that fall in their way; the size and quantity of the pieces they take at a meal; the curious chuckling noise which, in their anxiety for dispatch, they always make; and the jealousy with which they always view, and the boldness with which they attack any of their species that are engaged in devouring the finest morsels. When carrion is scarce, the Fulmars follow the living whale, and sometimes by their peculiar motions, when hovering at the surface of the water, point out to the fisher the position of the animal of which he is in pursuit. They cannot make much impression on the dead whale, until some more powerful animal tears away the skin, for this is too tough for them to make way through." The Forked-tail Petrel is distinguished by the peculiarity designated by its name, and has the same habits as the well-known Stormy Petrels, or "Mother Carey's Chickens." The latter are supposed by sailors to announce stormy weather; but who they are named after, unless it be some fancied witch, it is difficult to ascertain. A Mr. Scarth once kept a Stormy Petrel in a cage for three months, by "smearing her breast with oil, which she sucked from her feathers, drawing each singly between her mandibles." They follow and fly about ships for days together, not only as a shelter, but for the morsels which may chance to be thrown overboard. After very strong winds setting in from the sea, they are sometimes found far inland, but are

never seen to land voluntarily until the time of making their nests.

The Albatross, the heaviest of all aquatic birds, has no great toe, frequents the Australian seas, and lives on fishes spawn, mollusca, fishes, especially the flying fish, &c. Its eggs are good to eat, and its cry is very loud.

The nostrils of Gulls are placed near the middle of their beak, are long and narrow, and the light is seen through them; their tail is large, and their legs long. They are cowardly and voracious birds, feeding on all sorts of fishes, dead bodies, &c., and nest in sand, or the clefts of rocks. It is always a sign of bad weather when they seek the land in numbers. There are numerous species, one of which, apparently the Ivory Gull, from its black legs and perfectly white plumage, was caught by the author during one of her voyages across the Atlantic. It was much exhausted, and, as it perched on the vessel, suffered itself to be taken by the hand and caressed. She tried to feed it with sopped biscuit, pieces of meat, salt fish washed in sea water, &c.; but it ate very little, showed no signs of tameness, though it never offered to fly away, and died in three weeks. There are, however, several proofs that Gulls may be tamed; the most interesting of which is that of Dr. Neill, of Cannon Mills, Edinburgh, whose garden, and the treasures which it contains, have always made it one of the principal attractions of that beautiful city. This Gull was brought to Dr. Neill, in 1818, by a Newhaven fisher-boy, who had picked it up

at sea in the Frith of Forth. It was uninjured, but not fully fledged, and willingly fed on potatoes and kitchen refuse, with some ducks. It became familiar, would peep in at the kitchen windows for a piece of fat meat, and would follow a female servant, calling loudly for food. It proved to be a great Black-backed Gull, and remained till 1822, when it was ascertained that it had taken flight towards the north. In the October of that year, the servant saluted Dr. Neill, on his return home one day, with, "Sir, Big Gull is come back;" and in fact he had returned to his old haunts, and recognised a tame heron, with whom he had formerly been very intimate; but at that time he went in the morning and returned in the evening, and the servant wishing to secure him, put him in confinement. This was evidently so irksome to him that he was released; but it made him more shy and cautious than he had been. He, however, daily visited the garden, and took the food laid there for him. In March, 1823, he disappeared, but returned in the autumn, and continued this practice for years. He became again shy when the above-mentioned servant died; but in 1829, which was the eighth winter, he returned and brought another Gull with him, supposed to be one of his offspring, but which was soon shot by some chance sportsman. He continued his visits and farewells, excepting in 1833; but he returned in the following January, when he recognised Dr. Neill's voice, and hovered round his head. "For two years longer his visits were regular, and he arrived as usual in November 1838, and continued till towards the end of

January 1839. In stormy weather he was sometimes absent for eight or ten days, so that it was near the end of February before his early disappearance attracted particular notice, or excited fear for his safety. He never again made his appearance." Speaking of a Skua Gull, Dr. Neill says, "Skua is still alive in 1843. He has now entered his twenty-fourth year, has become grey-headed, or at least pale-headed; but is as lively, pugnacious, and fond of cheese and mutton as ever. I have a Cormorant four years older than Skua."\*

The Sea Swallows, so named from their resemblance to Land Swallows, have oblong nostrils pierced near the base of their beak, and from the formation of their feet, do not swim much. They fly with the greatest rapidity, uttering loud cries as they skim along the surface of the sea, and dexterously seizing the small fishes and mollusca on which they feed. They also frequent lakes and rivers, and come from the Arctic regions. There are many species, some of which visit Southern Africa, Brazil, &c. Noddies are excellent eating, and their young are said to remain with them for a whole winter after hatching. They chiefly feed on the small fishes which float among sea weeds, and abound in the Gulph of Mexico. They do not see well at night, and at that time may be easily taken, but they bite severely when handled. The Rhynchops resemble Sea Swallows in their little feet, long wings, and forked tail, but their

\* The above particulars were kindly supplied to the author by Dr. Neill, the words between inverted commas being those from a recent letter.

extraordinary beak gives them a very peculiar character. They can only catch that which comes to the surface of the water as they fly, and inhabit the West Indian seas.

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FAMILY III. TOTIPALMES.\*

Great toe united to the others in one membrane.

The entirely webbed feet of the Totipalmes serve them as oars, and yet, notwithstanding this formation, they are the only Palmipedes which perch upon trees.

TABLE XXXIX.

CLASS II. AVES.

ORDER VI. PALMIPEDES.

FAMILY III. TOTIPALMES.

GENUS I. PELICANUS. *Pelicans*.

A bare space at the base of the beak; skin of the throat more or less dilatable.

Subgenus 1. ONOCROTALUS. *Pelicans Proper*. — Beak very long, straight, wide, horizontally flattened, terminated by a hook; a dilatable membrane attached to the lower mandible.

2. PHALACROCORAX. *Carbo, Halieus, Cormorants, Cormorans*. — Beak long, compressed; upper mandible crook'd, lower truncated; claw of the middle toe dentated like a saw.

\* Wholly palmated.

Section 1. CORMORANTS PROPER. — Tail rounded and having fourteen pens.

Subgenus 3. TACHYPETES. *Frigate-birds, Men-of-war Birds, Fregattes.*—Forked tail; feet short, with deeply notched membranes; each mandible of beak curved at the end.

4. SULA. *Dysporus, Boobies, Soland Geese, Fous, Boubies.* — Beak straight, slightly compressed, pointed, and a little arched, dentated at the edges; throat and space round the eye bare; claw of middle toe dentated.

GENUS II. ANHINGA. *Plotus, Darters.*

Beak straight, slender, and pointed, edges dentated; long neck; small head.

GENUS III. PHAETON. *Tropic Birds, Straw Tails, Paille-en-queue.*

Two very long, narrow, pen-feathers in the tail; beak straight, pointed, dentated; feet short; wings long.

The nostrils of Pelicans are scarcely perceptible; their tongue is very small, and their gizzard is feeble. The beak of the Pelican Proper is remarkable for its size, and the elastic branches of the lower mandible sustain the large bag which the under membrane forms. There are two furrows in the upper mandible, and the nostrils are hidden in them; the eyes have a bare space round them. The common species is of a beautiful and delicate rose colour, and has a red beak. It nests in marshes, lives on live fishes, and is an inhabitant of the Old World. The author has seen numbers of these birds standing in a long line by the



side of the river Gaboon, apparently motionless, when presently, with the quickness of thought, one would dart its beak into the water, and out again, returning to its former stillness, then another, and so on, till, as their bag became so dilated as to hold no more, they flew heavily away to feed their young.

Cormorants have a small tongue, and their throat does not dilate as much as that of the Pelican. The nostrils are like a fine line. They build in the highest parts of rocks, and make their nests of sticks, pieces of sea-weed, and long coarse grass. The young are born blind, and are unable to fly till they are three weeks or a month old. They ascend rivers to a considerable distance, and their age has been already alluded to. The Chinese are said to train them to catch fishes for the table. They abound in Constantinople, and roost on the roofs of houses. Mr. Waterton thus perpetuates the old fable concerning these birds: "The Cormorant was once a wool merchant: he entered into partnership with the Bramble and the Bat, and they freighted a large vessel with wool. She struck on some rocks and went to the bottom. This loss caused the firm to become bankrupt. Since that disaster, the Bat skulks in his hiding hole until twilight, in order that he may avoid his creditors; the Bramble seizes hold of every passing sheep, to make up his loss by retaining part of its wool; while the Cormorant is for ever diving into the waters of the deep, in hopes of discovering whereabouts his foundered vessel lies."

The measurement of the Frigate Bird from tip to

tip is enormous, amounting sometimes to ten or twelve feet, and they fly to immense distances from land. They are principally found in tropical regions, devouring flying fishes and knocking over the Boobies to make them disgorge their prey, that they may seize upon it.

Boobies have nostrils prolonged into a line which reaches the end of the beak. They have been so named on account of the little resistance which they make against the attacks of the Frigate Bird; but whether they eat to excess or not, their stupidity always appears after a meal, and at other times they are lively. Several of them followed a vessel in which the author sailed, and stood on the sill of the stern windows, their heads on one side, as if listening to the conversation within. After eating they used to perch upon the rigging, and suffer themselves to be taken with the hand. The Soland Goose belongs to this subgenus, and frequents the British coasts; it is said to live to a great age, does not attain maturity till four years old, and becomes very tame. The young geese are covered with thick white down, and look like powder puffs.

The beak of the Tropic Birds is moderately strong, their feet short, their wings long; they fly over the broadest oceans in the torrid zone, and scarcely ever land except to nest in high trees. English sailors bestow the names of Marlingspike and Boatswain on them.

## FAMILY IV. LAMELLIROSTRES.

Beak thick, covered with a soft skin, edges furnished with plates like teeth.

A soft skin, rather than horn, covers the beak of the Lamellirostres.\* (See TABLE XL.) Their tongue is large, fleshy, and dentated at the edges. They live equally well in fresh and salt water; and in the greater number the lower part of the windpipe of the male bird is swelled into bags of different forms: their gizzard is large. The plates in the beak of the great genus *Anas*, seem placed there on purpose to let the water drain through them from the food of the bird before it is swallowed.

## TABLE XL.

## CLASS II. AVES.

## ORDER VI. PALMIPEDES.

## FAMILY IV. LAMELLIROSTRES.

GENUS I. *ANAS*. *Ducks, Canards*.

Large and wide beak, edges furnished with a row of thin, projecting plates, placed transversally.

Subgenus 1. *CYGNUS*. *Swan, Cignes*. — Beak as large before as behind, deeper than wide at the base; nostrils pierced nearly in the middle; neck, much elongated.

\* Beaks with plates.

Subgenus 2. **ANSER.** *Geese, Oies.* — Beak moderate, narrower before than behind, deeper than wide at the base.

Section 1. **GEESE PROPER.** — Beak as long as the head, the plates on the edges looking like pointed teeth.

3. **CLAKIS.** *Barnacles, Brand Geese, Bernaches.* — Beak shorter and slighter than others, plates not visible at the edges.

4. **CEREOPSIS.** — Beak small, the membrane of which extends a little over the forehead.

5. **ANAS PROPER.** *Ducks Proper.* — Beak less deep than wide at the base, and as wide at the end as near the head, or wider; legs short.

Division 1. of **ANAS PROPER.**

**PLATYPUS.** *Hydrobates, Fuligula.*

Great toe bordered by a membrane; head large; back short; legs placed far back; wings small; tail stiff; tarsi compressed; toes long; webs more or less entire.

Section 1. **OIDEMIA.** *Scoters, Macreuses.* — Beak wide and swollen.

2. **GARROTS.** *Claugula.* — Beak short, narrower in front; tail pointed.

3. **SOMATERIA.** *Eiders.* — Beak longer than the Garrots, coming further on to the forehead, so as to form an angle with the feathers.

4. **MILLOUINS.** *Fuligula.* — Beak wide and flat.

Division 2. of **ANAS PROPER.**

**ANAS of Prince of Canino.**

No membrane on the great toe; head and feet smaller than in the First Division, and neck longer.

- Section 1. **RHYNCHASPIS.** *Shovelers, Souchets.* — Beak long; upper mandible bent like a half cylinder, and widened at the end; plates like eye-lashes (or ciliated) on the edges.
2. **TADORNES.** — Beak much flattened towards the end, and having a swelling at the base.
3. **SARCELLES.** — Wholly composed of the smaller species.

GENUS II. **MERGUS.** *Mergansers, Harles.*

Beak more slender and cylindrical than that of ducks; each mandible armed with long, pointed teeth, leaning backwards; the end of the upper mandible crook'd.

The long and graceful neck of the Swan, and its dignified manner of swimming, are well known. They are remarkably fierce birds when they have young; striking their enemies with their powerful wings; they eat fishes and aquatic plants, nest in rushes, and fly fast and high. Each pair will take possession of a certain part of a river or lake, and permit no other swan to intrude upon their domain. They are wild all over Europe, and used formerly to be a source of revenue to the crown, inasmuch as no one could keep them without paying for the privilege, or even appoint a new swan-herd without a licence. To this day, companies and individuals keep them on public rivers, and distinguish them by marking their beaks. Young swans are reckoned good eating, and in past times they formed one of the dishes of a great feast whenever they were in season. The Guinea and the Gambia Goose are placed among the

swans, owing to the formation of their beak ; but they have no pretensions to the same elegance of form.

Geese Proper are also far from being as graceful as the swan, but are much slandered in an intellectual sense, for they often evince great sagacity, and give remarkable proofs of attachment. They walk better than swans or ducks, because their legs are placed more in the middle of their body : but even they have an awkward waddle. They come from the northern parts of the world. Most of them are fit for the table ; and one of them from Lapland, but occasionally found in England, is called the Laughing Goose, from the similarity of its note to a human laugh. The Barnacle or Bernicle Goose is celebrated for several absurd fables which are told of it in the north, such as its growing like fruit upon trees, &c. The Egyptian Goose is the Vulpanser, or Chenalopex of the ancients, and is found upon the Nile. It is remarkably beautiful in plumage, but is difficult to domesticate.

The neck of Ducks is comparatively short ; those of the First Division live more exclusively on fishes and insects, dive often, and are very awkward when they walk. The Eider Duck occasionally visits the coasts of England, and with care might probably be made a frequent guest, and consequently a source of much profit from the beautiful down which it affords.

Ducks of the Second Division walk better, and their body is more slender. They eat seeds and

aquatic plants, as well as fishes and other animals. Teal, Widgeons, Wild Ducks, Mallards, Gargansers, Dun Birds or Pochards, Scaup Ducks, Harlequin Ducks, and many others, are well known in England, but it is impossible, in a work like the present, to notice them particularly; they are, however, all described in Mr. Yarrell's beautiful work on British Birds.

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### CLASS III. REPTILES.

THE heart of Reptiles is so formed that only a portion of the blood which it receives from the different parts of the body goes into the lungs, and the rest returns without having been breathed, or received the air. From this smaller proportion of oxygen\*, the heat and activity of the blood are diminished, and reptiles are called cold-blooded animals. Their movements chiefly consist of crawling and swimming, and although some leap at certain times, yet their general habits are slothful, their sensations less acute, and many pass the winters of cold and temperate countries in a state of lethargy. They do not, however, all breathe alike, and those whose respiratory powers are the strongest have most

\* One of the elements of which the atmosphere is composed.

energy and sensibility. Their proportion of brain is less than that of the two former classes, and their movements depend less upon it, so that many of them continue to live and move after their heads are cut off. They are capable of suspending their breath for some time without stopping the circulation of their blood, and they are thus enabled to dive better than either Mammalia or Birds; and from requiring fewer vessels in the lungs, these latter organs are often reduced to something like a mere bag. They are oviparous, with occasional exceptions (to be hereafter mentioned), but none of them hatch their eggs. They possess a windpipe and larynx, but few have a voice. Their forms as well as their movements vary much, and it would seem that in them Nature had delighted in producing the most singular appearances, and modifying the general plan of Vertebrated Animals, especially in those which are exclusively oviparous. They were formerly classed according to the quantity of their respiration; but more recent naturalists have changed this mode, and it is presumed that TABLE XLI. will be found more in accordance with the latest arrangements.

## TABLE XLI.

## CLASS III. REPTILIA.

Order 1.	CROCODILIANS.	The back of the neck, body, and
<i>Loricata,</i>	<i>Emydosaurians.</i>	tail, covered with bony plates
		under a thick skin.



- |   |   |
|---|---|
| Order 2. SAURIANS.<br><i>Squamata.</i>      | The whole body and tail more or less covered with scales.                                       |
| Order 3. CHELONIANS.<br><i>Testudinata.</i> | Body enclosed in a shield above and below, composed of bony pieces covered with skin or scales. |
| Order 4. BATRACHIANS.<br><i>Amphibia.</i>   | Skin soft and naked.  |
- 

## ORDER I. CROCODILIANS.

Bony plates covering the greater part of the body under a thick skin.

THE Crocodilians (see TABLE XLII.), formerly placed among the Lizards, have ribs which are only partly attached to the sternum, and dilate and contract with respiration; they also have others which are not attached to either spine or sternum. They are animals of large size; their tongue is flat and fleshy, and attached to the jaw, except at the immediate edges, which made the ancients assert that they had none at all. Their back and tail are covered with very strong, square scales, each of which has a projection, or ridge, in the middle, so that the series forms a crest along the back and tail, which is double on the latter. The scales of the belly are square, thin, and smooth; their nostrils communicate by a canal, or passage, with the back of the mouth. Their external ear is closed at will

by two fleshy valves; their eye has three eyelids; their lower jaw is prolonged behind the skull, and the upper does not move. Under the throat are two small holes, the orifices of two glands, which secrete a musky pomatum. The vertebræ of their neck are so constructed as to render it difficult for them to turn, and they are thus easily avoided. Their respiration is more like that of quadrupeds than other reptiles; their eggs are as large and hard as those of a goose; the females watch them, and when hatched, take care of their young for several months.

## TABLE XLII.

## CLASS III. REPTILIA.

ORDER I. CROCODILIANS. *Loricata*.GENUS I. CROCODILUS. *Crocodile*.

Tail flattened at the sides; four feet; five toes before, four behind, the interior of each furnished with nails; one row of pointed teeth in each jaw; no collar bones; nostrils opening at the end of the muzzle in the form of crescents, and closing with valves.

Subgenus 1. GAVIALS. — Muzzle slender and prolonged; the fourth teeth below, lodging in a notch of the upper jaw; hind feet dentated on the outward edge, and palmated to the end of the toes; a large, cartilaginous projection encircles the nostrils.

2. CROCODILES PROPER. *Champses*. — Muzzle long and flattened; teeth irregular, the fourth below lodging in a notch of the upper jaw.

Subgenus 3. **ALLIGATOR.**—Muzzle wide and obtuse; teeth irregular, the fourth below lodging in holes in the upper jaw; feet half webbed.

Some crocodile's eggs, which had been packed in a small and slight barrel filled with sand, according to the request of a gentleman in England, were stowed in the corner of a warehouse at Bathurst St. Mary's, till the arrival of the vessel which was to take charge of them. As the owner of the warehouse and some of his servants were attending to other packages, they heard an unaccountable noise in one corner, which caused them to suspend their occupations, and alarmed the superstitious natives; who, until their master issued peremptory orders, and himself set the example, did not venture to ascertain the cause. In the search the barrel was uncovered, when the head of it burst open, and several dark heads emerged from the sand. Away rushed the natives, in the full belief that they were at least demons, leaving the merchant to his fate, who, after persuading them to return, prudently killed each as it crawled from its place of confinement.

Crocodiles inhabit fresh or brackish water, are carnivorous, but cannot swallow under water; they drown their prey, and seldom touch it till it is putrid.

Gavials have two large holes in the skull, behind the eyes, which may be felt under the skin, belong exclusively to the Old World; and the projection round their nostrils caused the ancients to assert that

Crocodiles were to be found in the Ganges, with horns.

Crocodiles\* Proper belong to both hemispheres, and, as well as Gavials, attain a huge size. They were worshipped and embalmed in Egypt, nor is Western Africa now without its sacred crocodiles. Instances are by no means rare among the natives of Western Africa, of escape from crocodiles with the loss of an arm or leg, and the best way to conquer them is, if possible, to attack them about the eyes. A remarkable accident happened to an Arab colt belonging to Colonel Findlay, commandant at Bathurst St. Mary's. The groom had taken it into the river (Gambia) to wash its legs, and as it was coming out, a crocodile bit one of them nearly off. A struggle ensued in which the crocodile retreated and the colt fell; he was, however, dragged over the sand to the stable close by, and a Moor in the neighbourhood undertook his cure, although the foot only hung to the leg by a tendon. The colt was strapped down, and the foot joined on, and bandaged; the parts adhered, and such was the skill of the doctor that no blemish ensued.

The Alligator† is of more slender proportions than the Crocodile, and its legs are longer. It has only been found in America.

\* From a Greek word which signifies "one who fears the shore." Champses was, according to Herodotus, the Egyptian name for these animals.

† A corruption of the word *lagarto*, the Portuguese for lizard.

## ORDER II. SAURIANS.

THE almost imperceptible passage from Lizards to Serpents has induced their combination into one order, of which, however, they form two separate groups (see TABLE XLIII.).

## TABLE XLIII.

## CLASS III. REPTILIA.

## ORDER II. SAURIANS.

Group 1. LACERTIANS. — With feet.

Group 2. OPHIDIANS. — Without feet.

## GROUP I. LACERTIANS.

Family 1. LACERTIANS. *Lizards*. — Tongue extensile; four feet; five unequal toes on each, furnished with nails; scales arranged in transverse, parallel bands.

Family 2. IGUANIANS. — Tongue fleshy, thick, not extensile, notched at the end; four feet.

Family 3. GECKOTIANS. — Nocturnal lizards; flattened head and body; four feet.

Family 4. CHAMÆLONIANS. — Skin covered with little scales like knots; body compressed, back sharp; tail round and prehensile; four feet, five toes on each, divided into two groups, each united by the skin as far as the nails; tongue long, fleshy, and cylindrical; teeth with three lobes; enormous lungs.

**Family 5. SCINCODIANS.**—Four or two feet, all short; tongue not extensile; scales equal, and imbricated, or covering the body in the manner of tiles upon a roof.

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### FAMILY I. LACERTIANS.

Four feet; five unequal toes on each foot.

Group I., or Lacertians, is subdivided into families, the first of which contains those which are more strictly speaking true Lizards (see TABLE XLIV.).

## TABLE XLIV.

### CLASS III. REPTILIA.

#### ORDER II. SAURIANS.

##### Group 1. LACERTIANS.

##### FAMILY I. LACERTIANS. *Lizards.*

##### GENUS I. MONITOR. *Tupinambis.*

Teeth in each jaw; tail compressed on each side.

**Division 1. MONITORS PROPER.**—Small and numerous scales on the body; a crest or keel all along the tail, formed by a double row of projecting scales; no pores in the thighs.

**Division 2. DRAGONNES.** *Teius, Crocodilurus, Ada.*—Angular plates on the head; large rectangular scales under the belly and round the tail; skin

of the throat covered with little scales and having two folds across ; pores inside the thighs.

Section 1. **DRAGONS PROPER.** — Scales with a ridge like that of Crocodiles, and forming a keel upon the tail, which is compressed.

2. **SAFEGUARDS.** *Sauve-gardes.* — No ridge to the scales ; teeth with notched edges ; tail more or less compressed.

Division 3. **AMERVA.** — Tail round ; that and the belly covered with large, square, transversal scales ; those of the throat small.

## GENUS II. LIZARDS PROPER.

Two rows of teeth on the palate ; a collar under the throat, formed by a transversal row of larger scales ; skull projects over the eyes and forms a bony shield at the top.

Subgenus 1. **ALGYRA.** *Algyres.* — Keel on the back and tail ; scales of the belly smooth and imbricated ; no collar.

2. **TACHYDROMES.** — Square, keeled scales on the back, belly, and tail ; no collar ; no pores on the thighs, but two under the tail.

The slender and extensile tongue of the true lizards ends in two threads ; their body is much elongated, and their movements more rapid than those of many reptiles. The tympanum or membrane of the ear, familiarly called the drum, is even with the surface of the skull,

or but little sunk in it. A prolongation of skin, longitudinally cleft, protects the eyes, and in the foremost angle is the vestige of a third eyelid. Their false ribs do not quite encircle the body, and inside the thighs of many is a row of pores perforated in the scales, and which probably communicate with glands, but the use of which is unknown.

The genus Monitor contains those of larger size : they have no teeth in the palate, and most of them have flattened tails, which makes them more or less aquatic. They are said to announce the approach of Crocodiles by a hissing noise. They are from the Old World, and are eaten by the natives of the countries in which they live. The author tasted one which was killed at the Isles de Los, and found its flesh white and delicate. One species is represented on the Egyptian monuments. Two lizards are found in England, the Sand and the Viviparous Lizard : the former frequents sandy heaths, and is recorded to have attained a foot in length ; the latter is one of those reptiles which brings forth living young. It is however believed that the egg is broken at the moment of its birth. Both feed upon insects.

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FAMILY II. IGUANIANS. *Agamians.*

Four feet ; tongue thick and notched.

The second family of the first group of Saurians bears the general form of the order, and its name



was originally given it in the island of Hayti. In its first genus is the Stellio of the Levant, which is said to be killed by Mahometans because it mocks them, by bowing its head as they do when they pray. The wings of the Dragons may be compared to those of the bat, but they do not join the limbs. They sustain the animal as it leaps from branch to branch, but it cannot fly.

### TABLE XLV.

## CLASS III. REPTILIA.

### ORDER II. SAURIANS.

#### Group 1. LACERTIANS.

#### FAMILY II. IGUANIANS.

Division 1. AGAMIANS. — No teeth in the palate.

Division 2. IGUANIANS PROPER. — Teeth in the palate.

#### Division 1.

#### GENUS I. STELLIO. *Stellions*.

Tail encircled by rings of large scales, which are often furnished with spines.

Subgenus 1. CORDYLUS. *Zonurus, Cordyles*. — Back and belly covered with transversal rows of large scales; skull like that of Lizards Proper, covered with plates; pores on the thighs; spines on many of the scales, especially those of the tail.

- Subgenus 2. STELLIO PROPER.** — The spines of the tail moderate; head swollen at the back by the muscles of the jaws; back and thighs have here and there larger scales than the others, which are sometimes spiny; small groups of spines encircle the eye; tail ends in a point; no femoral pores.
3. **DOEYPHORUS.** *Queues-rudes.* — No femoral pores; no spines on the body.
4. **UROMASTIX.** *Fouette, Queue, Stellions, Batards.* — Like Stellions without the swelling of the head; all the scales of the body small, smooth, and uniform, those of the tail larger and more spiny; pores on the thighs.

## GENUS II. AGAMA.

Head swollen; imbricated scales on the tail; no palatine teeth.

- Subgenus 1. AGAMA PROPER.** — Scales raised in a point or tubercle; groups of spines, or single spines in different parts of the body; skin of the throat folded, loose, and capable of extension.
2. **TAPAYES.** — Belly swollen; tail short and slender.
3. **TRAPELUS.** *Changeants.* — Scales small, and without spines; no femoral pores.
4. **LEIOLEPIS.** — Head less swollen, covered all over with very small, close scales; no femoral pores.
5. **TROPIDOLEPIS.** — Uniformly covered with imbricated and keeled scales; femoral pores.
6. **LEPOSOMA.** *Tropidosaurus.* — Like the above, but no pores.
7. **CALOTES.** *Galéotes, Lophyrus.* — Imbricated scales all over, often keeled, and ending in a point; spines on those of the back; tail very long; no visible femoral pores.

- Subgenus 8. **LOPHYRES.** — Keel larger than the above; tail compressed; no femoral pores.
9. **GONOCERPHALES.** — Ridge over each eye; crest on the nape of the neck; a dewlap and the tympanum visible.
10. **LYRIOCEPHALES.** — Tympanum hidden; crest on the back; keel on the tail.
11. **BEACHYLOPHES.** — Small scales; tail somewhat compressed; a small crest on the nape of the neck and back; a small dewlap; pores to the thighs; teeth notched.
12. **PHYSIGNATHES.** — The same teeth, scales, and pores as above; head very much enlarged behind; no dewlap; a crest of large pointed scales on the back and tail, which is much compressed.

GENUS III. **ISTIURUS.** *Lophura.*

A sharp, scaly, elevated crest, extending along part of the tail; scales of the belly and tail small; strong teeth, without notches; femoral pores; skin of the throat loose, and without dewlap.

GENUS IV. **DRACO.** *Dragons.*

The six first false ribs extend in a straight line, and support a prolongation of the skin, which forms a species of wing; body covered with small imbricated scales; a keel on the tail and limbs, the former of which is long; a dewlap; four incisors in each jaw; a long pointed canine on each side; twelve triangular, three-lobed grinders everywhere; no femoral pores.

Subgenus 1. **SITANA.** — Femoral pores; no wings; an enormous dewlap, which extends to the middle of the belly.

## Division 2. IGUANIANS PROPER (see TABLE XLVI.).

The common Iguana of America attains from four to five feet in size, and its flesh is delicious to the taste, but unwholesome. It chiefly lives on trees, but sometimes takes to the water, and eats fruits, leaves, and seeds. The Basilisk of Guiana has a membranous projection at the back of the head, like a hood, which is supported by cartilage. The lungs of the Polychrus are enormous, and fill almost the whole of the body; they change colour as the Chamæleons do, and their false ribs form complete circles. The ribs of the Agamies are similarly constructed, and they have the power of swelling and changing the colour of their dewlap. The cushion under their toes enables them to fix themselves firmly on various surfaces.

## TABLE XLVI.

## CLASS III. REPTILIA.

## ORDER II. SAURIANS.

## Group I. LACERTIANS.

## FAMILY II. IGUANIANS.

## Division 2.

## GENUS I. IGUANA.

Body and tail covered with small, imbricated scales; a row of spines, or rather upright, compressed, pointed scales along

the back; a compressed, hanging dewlap; femoral pores; plates on the head; compressed, triangular, sharp and notched teeth in the jaws; two rows in the palate.

GENUS II. ORPHYRESSA.

Small, imbricated scales; a small crest on the back and tail, the latter compressed; jaw teeth notched; no pores.

GENUS III. BASILISCUS. *Basilisks.*

Body covered with small scales; a high crest on back and tail; no pores.

GENUS IV. POLYCHRUS. *Marbrés.*

Femoral pores; small scales; no crest; plates on the head; a long and slender tail; a dewlap formed at will

GENUS V. ECPHIMOTES.

Small scales on the body only; tail thick, with large, pointed scales; flattened form; femoral pores.

GENUS VI. OPLURUS. *Quetzpaleo.*

No pores; scales of the tail pointed and keeled, as well as those of the back, which are smaller.

GENUS VII. ANOLIUS. *Anolis.*

Skin of the toes enlarged under the last joint but one into an oval disk, and furrowed underneath; scales like shagreen, or in small knots on the body and tail; dewlap; teeth sharp and notched; folds on the tail, each containing circular rows of scales.

## FAMILY III. GECKOTIANS.

Four feet ; head and body flattened.

The Geckotians (see TABLE XLVII.), have a thicker and flatter form than any of the preceding Saurians, especially about the head. Their toes are nearly equal in length ; the pupil of their eyes contracts vertically, like that of a cat, and they hide themselves in dark places during the day. Their eyelids entirely vanish between the eye and its orbit, which gives them a singular appearance, and their tympanum is not much sunk in the head. Only some species have femoral pores ; and when the tail has been broken off, neither folds nor tubercles are reproduced in the new tail. They are spread over the warm countries of each hemisphere, and the folds under the large toes of most of them enable them to adhere to the smoothest surfaces, even ceilings. Their heavy appearance resembles that of toads, and has caused the opinion that they are venomous ; but of this there is no proof.

## TABLE XLVII.

## CLASS III. REPTILIA.

## ORDER II. SAURIANS.

## Group 1. LACERTIANS.

## FAMILY III. GECKOTIANS.

GENUS I. GECKO. *Ascalabotes*, *Stellio*.

Eyes large ; eyelids very short ; tongue fleshy, not extensile ; a

row of very small, closely set teeth on the jaws, none on the palate; small scales like shagreen on the body, with occasional tubercles, and larger, flatter, and imbricated scales underneath; toes almost equal; tail with circular folds.

Division 1. **PLATYDACTYLES.**—Toes enlarged in their whole length, and transversal scales underneath.

Division 2. **HEMIDACTYLES.**—An oval disk at the base of the toes, which is formed by a double row of scales like an inverted V. The second joint rises from this disk, and is thin, having the third joint, or a nail beyond it; wide bands of scales under the tail.

Division 3. **THECADACTYLES.**—Toes wholly enlarged, transversal scales underneath, each having a deep furrow, into which the nail retires.

Division 4. **PTYODACTYLES.**—Only the ends of the toes enlarged, the under part folded like a fan; a crook'd nail placed in a fissure of each enlargement.

Division 5. **SPHERIODACTYLES.**—A little cushion at the ends of the toes; nails retractile.

Division 6. **STENODACTYLES.**—Tail round; toes furrowed underneath, and dilated at the edges.

Division 7. **GYMNODACTYLES.**—Toes slender and naked; tail round.

Division 8. **PHYLLURES.**—Toes slender and naked; tail flattened like a leaf.

Among the Ptyodactyles is that which frequents houses, and is called the House Master. It is of small size, and one was daily fed by the author for some time. It regularly appeared in the same place at the same hour, and received insects, bread, and fruit from her hand. At Cairo it is said to cause leprosy by mingling its poison with food.

## FAMILY IV. CHAMÆLONIANS.

Small knotty scales; tail round and prehensile; four feet; five toes on each.

## TABLE XLVIII.

## CLASS III. REPTILIA.

## ORDER II. SAURIANS.

## Group I. LACERTIANS.

## FAMILY IV. CHAMÆLONIANS.

GENUS I. CHAMÆLEO. *Cameleon.*

Skin shagreened; body compressed so much that the back appears sharp; eyes large, almost covered with skin; no visible external ear; back of the head rising like a pyramid; enormous lungs; tail round and prehensile.

It is impossible to imagine a much more disagreeable-looking animal than the Chamæleon, for its skin-covered eyes, with only a little hole opposite the pupil, its power of moving one of these while the other remains still, its thick head and throat, and its thin body, give an appearance of ugliness, for which there is no compensation in its colour. Each group of toes is united underneath by skin, and some of its false ribs meet each other. It is slow in its movements, feeds on insects, which adhere to its glutinous tongue, the only part which possesses rapid motion, and lives in trees. Its power of swelling its lungs



has perhaps caused the assertion that it subsists on air, and its transparency to that of frequently changing its colour. The author possessed one for several weeks, and often placed it on differently coloured substances, when it constantly assumed a faint tinge of the colour under it, but never spontaneously altered its hue. It frequently appeared brighter than at other times, in consequence of the blood rushing to the skin when the lungs were swollen and it was excited. It at times incessantly extended its tongue, probably to catch insects invisible to the author, but it always refused those which were offered to it. It died in the latitude of Lisbon.

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#### FAMILY V. SCINCOIDIANS.

Four or two feet; tongue not extensile; scales lying over each other like tiles.

### TABLE. XLIX.

## CLASS III. REPTILIA.

### ORDER II. SAURIANS.

#### Group I. LACERTIANS.

#### FAMILY V. SCINCOIDIANS.

#### GENUS I. SCINCUS.

Feet short; a variable number of toes; body almost one with the tail, covered with shining, uniform, imbricated scales;

small, closely set teeth; tongue fleshy, not extensile and notched.

Section 1. *SCINCUS PROPER.* — Teeth on the palate.

2. *TILIQUA.* — No teeth on the palate.

#### GENUS II. *SEPS.*

Body larger, and feet smaller than the above, the pairs far apart.

#### GENUS III. *CHALCIDES.*

Body much elongated; four feet; scales rectangular, forming transversal bands.

#### GENUS IV. *BYPEDES. Bipes.*

No fore feet.

#### GENUS V. *BIMANES. Chiotes.*

No hind feet; head obtuse; scales of *Chalcides*.

The form of the Scinques varies, some being like a spindle, and others almost cylindrical, and more or less elongated, approaching that of serpents. They are from both hemispheres, have free toes, and nails upon them, the number of which varies; the *Lacerta monodactyla* apparently having but one.

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### GROUP II. OPHIDIANS.

#### FAMILY I. *ANGUIS. True Serpents.*

From their total inability to walk, the Ophidians better deserve the name of Reptiles \* than any others of the Class; but the first family still preserves strong

\* From *repto*, to crawl.

similarities to the last genera of reptiles, and possesses bones under the skin, which belong to the members.\*

TABLE L.

CLASS III. REPTILIA.

ORDER II. SAURIANS.

GROUP II. OPHIDIANS.

- Family 1. **ANGUIS.** — Bony head ; three eyelids ; tongue fleshy, notched, and but little extensile ; scales equal and imbricated ; body elongated ; rudimentary bones ; scales.
- Family 2. **TRUE SERPENTS.** — No sternum ; no rudimentary bones ; ribs encircling a great part of the body ; jaws capable of dilating ; palatine teeth, which are sharp and curved backwards ; scales ; occasionally a small hook under the skin instead of hind legs.
- Family 3. **NAKED SERPENTS.** — No scales ; excessively small eyes or none ; skin to all appearance glutinous, and marked with annular folds or wrinkles ; head flattened ; ribs short ; teeth both in the jaws and palate arranged in two concentric lines ; nostrils opening behind the palate.

\* Mr. John Gray has very judiciously thrown the family Anguis, and the last genera of Saurians into one group or order, called Saurophidia ; but as it would be difficult for the general reader to detect the rudimentary bones which justify this classification, the method of Baron Cuvier has been adopted.

## TABLE LI.

## CLASS III. REPTILIA.

## ORDER II. SAURIANS.

## Group II. OPHIDIANS.

## FAMILY I. ANGUIS.

GENUS I. ANGUIS. *Orvets*.

Entirely covered by imbricated scales.

Subgenus 1. Tympanum visible ; an indistinct fold in the skin in the place of the fore feet ; scales square and thick ; smaller scales between those of the back and belly, which produce a longitudinal furrow on each side ; rudimentary bones of hind legs.

2. OPHISAURUS. — No rudimentary bones of hind legs.

3. ANGUIS PROPER. *Orvets*. — Tympanum hidden under the skin ; teeth of jaws compressed and crook'd ; none in the palate ; no furrow on the side.

4. ACONTIAS. — No sternum ; foremost ribs united by cartilaginous prolongations ; teeth small and conical.

Among these, the *Ophisaurus ventralis* has a tail longer than its body, and which breaks so easily in every part that it is called the Glass Serpent. In this family, also, is the Slow, or Blindworm, found in all parts of Europe, except the far north. It is perfectly harmless ; its teeth are extremely small, and it is so

frightened, when attacked, that it becomes quite stiff, and is easily broken to pieces. It eats small slugs, insects, and earthworms, and its young are born blind.

The non-venemous True Serpents (see TABLE LII.) have four rows of teeth above, and two below.

## TABLE LII.

### CLASS III. REPTILIA.

#### ORDER II. SAURIANS.

##### Group II. OPHIDIANS.

##### FAMILY II. TRUE SERPENTS.

Tribe 1. **DOUBLES MARCHEURS.** — Head one with the rest of the body; walks backwards or forwards at will; eye very small.

Tribe 2. **SERPENTS PROPER.** — Jaws so constructed as to dilate, in order to swallow objects larger than themselves; sharp, palatine teeth, curved backwards.

##### Tribe 1. DOUBLES MARCHEURS.

##### GENUS I. AMPHISBOENA. *Amphisbènes.*

Body surrounded by circular rows of quadrangular scales; pores under the tail; teeth conical, not numerous, and only in the jaws.

Subgenus 1. **LEPOSTERNONS.** — Plates interrupting the rings in the fore part of the body; no pores; head short.

##### GENUS II. TYPHLOPS. *Stenostoma.*

Body covered with small, imbricated scales; muzzle projecting, furnished with plates; tongue long and forked; eye scarcely visible.

The first genus among the True Serpents from America, has fixed jaws, and consequently no power of dilating its mouth. Proceeding to those whose jaws are not joined together, and dilate, we find the formidable Boas, which are the terror of every country where they are to be found. They are the largest of all snakes, attaining from thirty to forty feet in length, and swallow dogs, deer, goats, and some say, even oxen. They entirely crush their prey in their strong, muscular folds, cover them with their saliva, and then swallow them by degrees, so that they may be seen for days lying with only part of their prey inside, and the rest hanging out of their mouth. When they have had a full meal, they become stupid, and are easily killed. Baron Cuvier believes that true Boas are confined to the New World, those reported as such in the other hemisphere being Pythons, which attain the same length, and have the same habits. Many are the fearful stories told of both, in which so much fiction is blended with truth, that it is difficult to separate the real from the false. In the subgenus *Oligodon* (see TABLE LIII.) is the serpent always sculptured by the ancients on the statues of Esculapius; also the common snake of England, which feeds on young birds, mice, other small quadrupeds, lizards, and especially frogs. It draws the legs or the head of the latter in first, and as one side of the jaw will act at a time and the two move alternately, they gradually swallow their prey. Mr. Bell, in his "History of British Reptiles," says, that the frog is generally alive all the time, and that he once

saw a small one leap out of a snake after having been swallowed, and when its devourer yawned, which it frequently does after eating, and that he even heard a frog squeak, several minutes after having been taken into the snake's body.

### TABLE LIII.

## CLASS III. REPTILIA.

### ORDER II. SAURIANS.

#### Group II. OPHIDIANS.

#### FAMILY II. TRUE SERPENTS.

##### Tribe 2. SERPENTS PROPER.

##### Division 1. *Not venemous. Fixed teeth, not pierced.*

##### GENUS I. TORTRIX. *Rouleaux.*

Tongue thick and short; cylindrical head and body; scales small; the largest on the belly, and under the tail; the latter very short.

Subgenus 1. **UROPELTIS.** — Tail very short, obliquely truncated above, flat, and shagreened at the end; head very small; muzzle pointed; a row of lesser scales under the belly and tail.

##### GENUS II. BOA.

Jaws capable of great dilatation; back of the head more or less enlarged; tongue forked; the under part of the body and tail, with transversal bands formed only of one piece.

Subgenus 1. **BOA PROPER.** — Two hooks under the tail; body compressed, larger in the middle; tail prehensile; scales proportionably small.

- Section 1. Head covered to the end of the muzzle with small scales, similar to those of the body.
2. Scaly plates from the eyes to the end of the muzzle.
  3. Scaly plates on the muzzle; depressions like dimples in the plates on the jaws.
  4. CORALLE. *Xiphosoma*, *Cenchrus*. — Plates on the muzzle; the sides of the jaw hollowed like a crack, under and beyond the back of the eye.
  5. XIPHOSOMA. *Cenchrus*. — Projecting plates on the muzzle, in the shape of a wedge; body much compressed; keel on the back.
- Subgenus 2. PSEUDO-BOA. *Scytales*. — Plates on the muzzle and skull; head one with the body.
3. ERIX. — Tail very short; obtuse, narrow, ventral plates; head short; small scales on the head; no hooks.
  4. ERPETONS. *Rhinopirus*. — Two soft projections at the end of the muzzle; large plates on the head; tail long and pointed.

### GENUS III. COLUBER. *Couleuvres*.

Plates under the tail arranged in pairs.

- Subgenus 1. PYTHON. — Hooks under the tail; narrow ventral plates; plates at the end of the muzzle; depressions at the lips.
2. CERBERUS. *Cerbères*. — Most of the head covered with small scales; plates between and before the eyes; no hooks; some with simple plates at the base of the tail.
  3. XENOPELTIS. — Large, imbricated, triangular plates behind the eyes.
  4. HETERODON. — End of the muzzle in one piece, pyramidal, and a spine above.



Subgenus 5. **HUBBIA.** — Plates simple at base, double at the point of the tail.

6. **DIPSAS.** *Bangarus.* — Body compressed, smaller than the head; the row of scales on the back larger than the rest.
7. **DENDROPHIS.** *Ahetulla.* — Scales on the back large, narrower on the sides; body long and slender; head of the same width.
8. **DRYINUS.** *Passerita.* — Body as above; a slender, pointed appendage to the muzzle.
9. **DRYOPHIS.** — Scales equal, form as above; no appendage.
10. **OLIGODON.** — Small in size; obtuse, short, narrow head; no palatine teeth.

#### GENUS IV. ACROCHORDUS.

Small, uniform scales all over.

Division 2. *Venemous. Venom conducted by isolated fangs.*

GENUS I. **CROTALUS.** *Rattlesnake, Serpents à sonnettes.*

Simple plates under the body and tail; several scaly pieces in the shape of a funnel at the end of a tail, loosely fitted into each other, which move and rattle as the animal crawls, or shakes its tail; a depression round each nostril.

Subgenus 1. **BOTHROPS.** *Cophias, Trigonocéphales.* — No rattles or depressions; other characters as above.

#### GENUS II. VIPERA. *Viper, Vipères.*

Double or simple plates under the tail; no depressions behind the nostrils.

Subgenus 1. **Naia.** — Plates on the head, the foremost sides of which have the power of rising and standing forwards, so as to dilate into a sort of hood.

- Subgenus 2. ELAPS.** — Head one with the body, and does not dilate.
3. **MICEURES.** — As above, with a very short tail.
  4. **PLATURES.** — Plates on the head; double plates on the tail; the latter flattened like an oar.
  5. **TRIMERESURES.** — Large plates on the head, partly double, partly simple.
  6. **OPLOCEPHALES.** — Large plates on the head; subcaudal plates simple.
  7. **ACANTHOPHIS. Ophrias.** — Plates in front of the head; tail ended by a hook; subcaudal plates double at the end.
  8. **ECHIS. Scytales.** — Head covered with little scales; subcaudal plates, simple.
  9. **LANGAHA.** — Head covered with plates; muzzle projecting and pointed; foremost half of the tail encircled by rings, the last half covered with small, imbricated scales.

**Division 3. *Venom conveyed by teeth and not fangs.***

**GENUS I. BONGARES. *Pseudo-boia.***

Simple plates under the belly and tail; head short, covered with large plates; back of the head a little enlarged; back with a keel, and a row of larger scales than those of the sides.

**GENUS II. HYDRUS. *Hydrophis, Pelamides, Hydres.***

Hind part of the body and tail much compressed.

- Subgenus 1.** A row of large scales under the belly; head small, obtuse, and having large plates.
2. **PELAMIDES.** — Large plates on the head; back of it enlarged; lower jaw very dilatable; all the scales small, equal, and arranged like a hexagonal pavement.
  3. **CHERSYDRUS.** — Head and body equally covered with small scales.

Snakes are very fond of water, and swim easily with their heads above the surface. They shed their skins at different times of the year, and the animal is blind for some time before it takes place. When this outer covering is thick and the under one formed, the snake creeps into thick grass or brushwood, which seizes hold of the skin, and it is thus drawn off like an inverted glove. They are oviparous, pass the winter in torpor, congregated in numbers, and are very easily tamed. Mr. Bell mentions one who knew him from every one else, and hissed at strangers. They frequent damp places, and are found in most parts of Europe, though not in Ireland; but Mr. Bell supposes this to have arisen from success in having exterminated them, rather than from any local peculiarity. They are said to be eaten in various parts of England.

One of the most venomous of all serpents is the Rattlesnake, which belongs exclusively to America and the West Indian Islands. It crawls slowly, and will not bite unless provoked; it feeds on birds, squirrels, &c.; and the story of its fascinating its prey is to be ascribed rather to the alarm of its victim than to any power of its own. The number of its rattles increases with age, and a fresh scale is said to be added each time that it changes its skin. The yellow species

frequents the sugar plantations, and is particularly dangerous.

Speaking of the common Viper, which is a native of Great Britain and most parts of Europe, always excepting Ireland, Mr. Bell gives a very interesting description of the apparatus by which the poison wounds are inflicted by all venomous serpents with fangs, and which is here abridged. "On each side of the upper jaw, instead of the outer teeth, are two or more, long, curved, tubular teeth, called fangs, attached to a moveable bone, articulated into the jaw bone and moved by a peculiar muscle. When at rest they incline backwards, and are covered by a fold of the skin, and when used stand erect. The tooth is pierced with a tubular hole in its whole length, the base of which is imbedded in a bag, into which the poison is poured from the gland which secretes it. When the serpent bites, the pressure upon the tooth forces the poison through the tube, and it is lodged in the hole made by the tooth. Previous to making an attack, the animal coils itself, raises its head and neck, bends the latter back, and then darts its head forward and strikes the fangs into its enemy with the greatest rapidity. The poison is quickly secreted, and is increased by irritation; it is yellow, without taste or smell, and can be swallowed with impunity, provided there are no wounds in the mouth or throat." The first bite is always the most dangerous, and Mr. Bell gives an account of a serpent, which, after killing several smaller rats was at last conquered, and partly devoured by a large one. The author once witnessed

a combat between a venomous serpent and a large rat, in which the latter died in a very short time, and the serpent appeared to suffer very little.

The common Viper is viviparous, feeds on small quadrupeds, and occasionally birds, and is said to lose its venom in cold weather. The Adder is a species of viper. The foreign species is remarkable for having a small pointed horn over each eyebrow, and is called the Cerastes. It is found in the deserts of Africa, and often mentioned by the ancients.

The Cobra Capello is in the first subgenus, and is one of the most deadly of all serpents, but after its fangs are extracted it is the charmed serpent of the Indian jugglers. A friend of the author was walking in his garden near Madras, and observing that a small drain was stopped, enquired the reason of the gardener. The man replied that it was probably obstructed by a snake, and, therefore, no one had dared to remove the obstacle. The gentleman's coachman, who was close by, waiting for orders, hearing this, took a spade and inserted it into the hole, upon which a large Cobra Capello bit him in the arm. His master, much alarmed, offered him the best medical assistance, but the man refused, saying that he would rather pursue the plan adopted by his countrymen. Curious to see what this was, the master accompanied the servant to the native doctor, who, taking a sharp knife, cut three deep gashes above the bite, and burnt each with a red hot iron. The patient was ill for some time, but eventually recovered. The native jugglers put the Haji into a

lethargic state by pressing on the back of the neck. Its habit of raising itself when any one approaches, caused the Egyptians to make it the emblem of divine protection, and to carve it on the portals of their temples. It is also the Asp of Cleopatra.

Residents from both hemispheres relate many curious adventures with serpents, but it is difficult to fix them on the right species, owing to the parties having only known the native names. As these creatures creep into small apertures, they are found in beds, drawers, &c., and the author heard of a gentleman who, in the act of drawing on his boot, found one moving at the bottom: he had the presence of mind to force his foot in rapidly, and stamp several times on the ground, and then, finding all still, ventured to take the boot off again, and completely kill the animal. Another acquaintance of the author was sleeping in a bed entirely enveloped by mosquito-curtains, and awaking at daylight, he saw a small poisonous snake sleeping at the top, and while he was considering the chances of its falling in upon him, and whether he ought to get up and try to kill it, a much larger snake climbed up the bed post, and seizing the smaller one, dragged it down and devoured it.

The scales of what are called Naked Serpents (see TABLE LIV.) are arranged transversely, in several rows, between the wrinkles of the skin, but are only to be found by dissection. Their ribs do not meet, and their head is bony. They are singular looking animals, one species of which lives under-

ground, in the marshes of Brazil, and another is totally blind.

TABLE LIV.

CLASS III. REPTILIA.

ORDER II. SAURIANS.

Group II. OPHIDIANS.

FAMILY III. NAKED SERPENTS.

GENUS I. CÆCILIA. *Cecilies*.

Eyes excessively small, nearly hidden under the skin, or none; skin smooth, viscous, and furrowed or wrinkled; hidden scales; head flattened; teeth of jaws and palate in two concentric lines, often sharp and curved backwards; nostrils opening behind the palate.



ORDER III. CHELONIANS.

A shield above and below, covered with scales or skin.

THE outward appearance of the third order of Reptiles separates them from all others of the class, inasmuch as they have an upper and under shield or covering, beyond which the head, neck, tail, and four feet alone are visible. The upper shield, called

the Carapax, is formed by the enlargement of the eight pairs of ribs, united to each other by zig-zag joints; and by adhering plates to the vertebræ of the back; so that all these parts are deprived of motion. The lower shield, or plastron, is formed of pieces which represent the sternum. A frame-work of other pieces, which resemble the cartilaginous part of ribs, and which in one subgenus remain cartilaginous, encircles the carapax, and unites the ribs which compose it. Thus the vertebræ of the neck and tail are alone moveable. These bony shields are covered either with scales or skin. The tongue of these animals is short; they are strictly oviparous; their eggs have a hard shell, and they are very tenacious of life, as they will live for weeks without a head, and pass even years without eating (see TABLE LV.).

## TABLE LV.

## CLASS III. REPTILIA.

ORDER III. CHELONIANS. *Testudinata*,  
*Cheloniadæ*.GENUS I. TESTUDO. *Chersine*, *Tortoises*, *Turtles*, *Tortues*.

No teeth; jaws, with one exception, covered with horn, like those of birds.

Subgenus 1. TESTUDO PROPER. *Land Tortoises*, *Tortues de terre*. — Carapax vaulted, the greater portion of the sides united to the plastron; toes very short, and united nearly as far as the nails, five on the fore feet, four behind, all thick and conical.



- Subgenus 2. **KINIXYS.** — The carapax moveable.
3. **PYXIS.** — Fore part of the plastron moveable.
4. **EMYS.** *Fresh-water Tortoises, Tortues d'eau douce.* — Toes more separate than those above; nails longer; carapax flatter.
5. **TERRAPENE.** *Box Tortoises, Tortues a boite.* — Plastron divided into two sections by a hinge, and entirely closing the shields when the head and limbs are withdrawn.
6. **CHELYDRA.** *Chelonura.* — Limbs and tail too large to be drawn within the shields.
7. **CHELONIA.** *Caretta, Turtles, Tortues de mer.* — Shields too small to receive head and feet; the latter much prolonged and flattened into fins; toes all united and enveloped by the same membrane; only the two first toes of each foot have a nail, which falls early.
8. **SPHARGIS.** *Leathery Turtle, Coriudo, Dermochelis.* — The shield covered with a species of leather.
9. **CHELYS.** *Tortues a gueule, Chélides, Matamata.* — Feet and nails of Emys; shields very small; nose prolonged into a small trench; large mouth; no horn upon the jaws.
10. **TRIONYX.** *Tortues molles.* — No scales; shields covered with a soft skin; feet palmated; only three of the toes on each foot provided with nails; horn of the beak covered with fleshy lips.

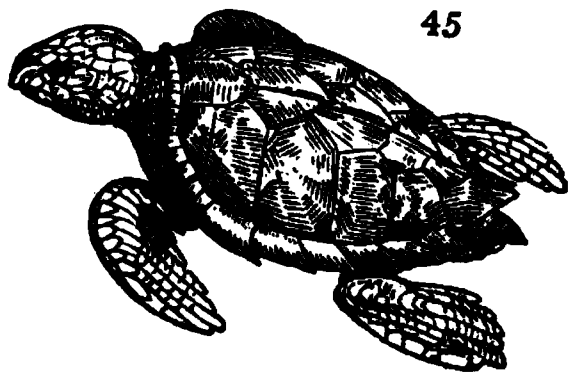
The legs of the Land Tortoises are short and clumsy, their carapax very strong, and their movements slow. Some of the species are more than three feet in length, and others no larger than a snuff box. Several of the American species bear much greater

cold than that of our winters, and it is thought, that as they afford a wholesome and agreeable food, they might be advantageously introduced into England.

The body of the Fresh-water Tortoises is covered with a coriaceous skin, which projects beyond the edges, and serves the same purpose as the side fins of flat fishes, viz. to get under the sand and mud. Their neck is long, and they suddenly dart forth their heads, to catch the fishes on which they feed, and which they first tear in pieces, assisted by their sharp claws. They also eat frogs and young birds.

The plastron of the Terrapene is formed of two valves, united by a cartilaginous hinge; and when the animal draws in its head, tail, and limbs, it closes its two shields as firmly as if it were a box. This Tortoise lives on fishes, is generally eaten, and often fattened for the table with grains, &c., in the south of Europe.

Between the pieces which compose the plastron of Sea-turtles, there are large intervals occupied by cartilage, and their head has a bony casque. Their gullet or œsophagus is furnished inside with sharp, cartilaginous points, directed towards the stomach, which allow the water swallowed with their food to return by way of the mouth, but not the food itself. The Green Turtle is well known for contributing a rich and delicious dish to great feasts; but to those of simpler



tastes, it is even better when plainly cooked. The author tasted it when it was impossible to obtain the ingredients to dress it in the usual fashion, and was surprised to find it a plain, wholesome meal. Their eggs are excellent. They are called Green Turtle because their thirteen hexagonal scales are of a green colour: they sometimes weigh from seven to eight hundred pounds, and feed upon sea-weed, at the bottom of the water, but come to the surface to breathe. They are numerous at Ascension, the Cape de Verde Islands, in the Gulf of Florida, the Indian Seas, the Pacific, &c., repair to the shore to lay their eggs, sometimes to the number of two hundred and fifty, during the early part of the summer; and it is believed that they return to the same place for years.

The Hawk's-bill Turtle supplies the tortoise-shell of commerce, which is prepared and moulded into various forms by heat; even the filings are turned into a sort of paste by boiling, which is then made to assume various shapes. The flesh of the Hawk's-bill is reckoned very unwholesome.

The Sphargis is entirely covered with a substance like leather; its head is sharp; its jaws very strong, and that above has three notches in front; the lower jaw has a sharp hook; the eyes open vertically, and the carapax has seven distinct ridges in it, composed of tubercles. This is supposed to have suggested the lyre, and legends say, that Mercury found a tortoise-shell on the shore, to which he put seven strings, and drew music from it. The flesh is unwholesome.

## ORDER IV. BATRACIANS.

Skin naked; breathing through branchiæ when young, and through lungs when in a perfect state.

Batrachians \* or Amphibia (see TABLE LVI.) have two lungs, of equal size, to which branchiæ are added when they are young, or in the tadpole state. As they reach maturity, they lose the branchiæ and the apparatus which supports them, and their circulation is effected by means of lungs only; in fact, from fishes they become reptiles. Some few are viviparous, but with those which are not, the egg shells are membranous, generally deposited in the water itself, and so transparent, that the progress of the animal within may be traced. In warm climates, four days elapse between the laying and hatching of the eggs; but in our climate it is a period of a month. Their branchiæ project on each side, in the shape of narrow, irregular leaves, in which, with the assistance of a microscope, the current of the blood may be traced.

## TABLE LVI.

## CLASS III. REPTILIA.

## ORDER IV. BATRACIANS.

Tribe 1. — Those which lose their branchiæ when young, and then breathe through lungs.

Tribe 2. — Those which lose their branchiæ so soon, as to be supposed never to have had any.

Tribe 3. — Those which always have branchiæ.

\* From the Greek word for a frog.

## Tribe 1.

GENUS I. RANA. *Frogs, Grenouilles.*

Four legs; no tail; head flat; muzzle round; mouth much cleft; fore feet with four toes, hind feet with five, and sometimes the vestige of a sixth; lungs; no ribs; the tadpole has a long fleshy tail, a small horny beak, and fringes by the side of the neck instead of limbs; branchiæ.

Subgenus 1. RANA PROPER. *Frogs.*—Body longer than that of others; very long powerful hind legs; feet more or less webbed; skin smooth; upper jaw provided all round with a row of small fine teeth, an irregular transversal row across the palate.

2. CERATOPHEIS. — Head wide; skin shagreened; a membranous projection on each eyelid like a horn.
3. DACTYLETHRA. — Head small; mouth moderate; tongue attached to the bottom of the throat, and oblong, fleshy, and large; skin smooth; toes pointed; hind feet widely palmated; the three internal toes enveloped in a conical nail of a horny, black substance.
4. HYLÆ. *Calamita, Tree Frog, Rainettes.* — The extremity of each toe enlarged, and rounded into a species of viscous cushion.
5. BUFO. *Toads, Crapauds.* — Body enlarged, covered with warts or papillæ; a large pad, pierced with pores behind the ear, whence issues a foetid humour; no teeth.
6. BOMBINATOR. — Like the above, except that the tympanum is hidden under the skin.
7. OXYRHYNCHUS. *Rhinelles.* — Muzzle pointed.
8. OTILOPHES. — Muzzle angular; a crest on each side of the head.

Subgenus 9. **BREVICEPS.** *Engystoma*. — No visible tympanum; body oval; head and mouth very small; feet a little palmated.

10. **PIPA.** — Body horizontally flattened; head wide and triangular; no tongue; tympanum hidden; small eyes; four small toes on the fore feet, each pointed, and separated at the end into four sharp divisions.

**GENUS II. SALAMANDRA.** *Salamanders, Newts*  
*Salamandres.*

Body long; four feet; tail long; head flattened; ear hidden; small and numerous teeth in each jaw, two rows in the palate; four toes before, almost always five behind.

Subgenus 1. **SALAMANDRA PROPER.** — Tail round; only frequent water when tadpoles.

2. **TRITON.** *Water Newts, Salamandres aquatiques.*  
— Tail compressed vertically; pass their lives in water.

Tribe 2.

**GENUS I. MENOPOMA.** *Abranchus, Cryptobranchus, Protonopsis.*

Form of the Salamander; eyes visible; feet well developed; an orifice on each side of the neck; row of fine teeth in the jaws, another in front of the palate.

**GENUS II. AMPHIUMA.**

Body very long; legs and feet but little developed; two rows of teeth along the palate; orifices in the neck.

Tribe 3.

**GENUS I. AXOLOTS.**

Four toes before, five behind; three long branchiæ like tufts;

teeth fine and soft, two rows on the palate, and one in the jaws.

GENUS II. MENOBRANCHUS. *Necturus*.

Four toes on each foot; teeth in the palate and jaws.

GENUS III. PROTEUS. *Hypochton, Protées*.

Three toes before, two behind.

GENUS IV. SIREN. *Sirènes*.

Nearly the form of eels; three branchial tufts; no hind feet; head flattened; muzzle obtuse; eye very small; ear hidden; teeth all round the lower jaw, none in the upper, several rows in the palate.

The tadpole of frogs has a long tail, and a horny beak. When the branchiæ have attained their full size, they begin to contract, and are entirely withdrawn, or absorbed within the branchial cavity; the beak falls off; the eyes are formed; the limbs appear like little tubercles, and gradually develope, the hind legs first; the tail is absorbed, and the perfect animal is produced.

Frogs have a soft tongue, which is attached to the edge of each jaw and folds back upon itself. A cartilaginous plate, even with the surface of the head, takes the place of the tympanum, and marks the ear outside. The eye has two fleshy eyelids, and a third, which is trans-

parent and horizontal. The moisture which always appears upon their skins is secreted in a bladder or reservoir, the contents of which can be at any time thrown upon the surface of the animal, and which is in some measure connected with their respiration. Their voice can only be called a croak, although some persons consider it as a cheerful sound; and they feed on insects and slugs. They pass a great part of the year without eating; but the quantity which they devour when in an active state makes them useful in gardens. They suddenly throw the folded part of their tongue forwards, and as it possesses a clammy juice, the prey sticks to it, when it is instantly restored to its usual position, and the food goes down the throat. They pass the winter in mud, at the bottom of water, where they congregate in multitudes. They change colour almost as much as the *chamæleon* does. Mr. Bell relates concerning a frog, that it became very familiar, and for three years issued from its hole at meal times and was fed, and in the evening constantly made its way to the fireplace, where it basked in the warmth till the family went to bed. It even formed a friendship with an old cat, and nestled under his fur, he being very careful not to disturb or inconvenience his strange companion. The *Rana esculenta* is of a beautiful green, spotted with black, and yields an agreeable and wholesome food to those whose prejudices will allow them to partake of it. Tree frogs, as their name denotes, live on trees, where they pursue insects, but lay their eggs in water. The male



has a bag under his throat which swells when he cries. They are generally green ; but a South American species is sky-blue above, and rose colour underneath.

Toads creep rather than crawl, are very ugly in form, but are not poisonous, as many have asserted. They eat live insects and worms of all kinds, and become torpid in winter. They dart out their tongues as frogs do, and when they have a troublesome worm, push it into their mouth with their fore feet. They shed their skin as other reptiles do, and with them it cracks on the back and belly in a longitudinal direction, gradually separates, and becomes wrinkled. By constant twitchings of the body these separated parts are brought to the sides ; then one hind leg is drawn out, the other follows, and the skin is tucked by the hind feet under the fore legs, where it is held until these are extricated ; it is then made into a little ball, pushed into the mouth, and swallowed. It is difficult to believe the stories which are told of toads having lived for many years imbedded in stone, and then being able to eat and crawl when discovered : they are, however, so respectably authenticated, that no other observation can be allowed upon them than that it is a mystery which nothing has at present elucidated. The accusation of poison probably arises from a number of glands situated on the back and sides, which secrete and send forth a foetid and acrid liquor, which, however, is perfectly harmless. One species runs faster than others, and is called the Natter Jack, and the female of the

Guyana Pipa hatches her eggs upon her back, her skin swelling round them, and her young remaining there while they are in the form of tadpoles.

Salamanders, or Newts, resemble lizards in form; they have the cartilaginous plate, instead of a tympanum, the tongue of frogs, no third eyelid, some vestiges of ribs, but no sternum. They are alive as soon as they leave their mother, have three branchial tufts on each side of their neck, and a membranous operculum covers the branchial hole. The fore feet are first developed. The terrestrial species has a gland on each side of the back of the head like that of toads, and the common Newts have a row of tubercles on their sides, whence issues a milky fluid which has a strong smell, and is poisonous to feeble animals. The resisting property of this fluid has probably given rise to the fable that the Salamander escapes unhurt from fire. The aquatic Salamanders have been rendered famous by Spallanzani, who ascertained that they are capable of reproducing any member with its toes, muscles, &c. which may have been cut off. Dufay proved that they might be frozen in ice, and remain there a long time without perishing. The Prince of Musignano remarks: "it is a wonderful circumstance, that an animal so tenacious of life should die with the most violent convulsions on having a little salt sprinkled on it." The female deposits a single egg at a time on the leaf of some aquatic plant, then with her hind legs folds the leaf over it, which adheres and protects the egg from injury. In a short time she proceeds to another leaf.

there to lay another egg, &c. They remain torpid at the bottom of ditches and springs all the winter, and during this time the dorsal crest of the male disappears, but comes forth again in the spring. Their skin comes off in shreds, and is washed away. The *Proteus* is an inhabitant of the subterranean waters of Carniola, is about a foot long, as thick as a large finger, has a vertically compressed tail, and four small legs. Its muzzle is long and flattened; it has teeth in each jaw; its tongue is free in front; its eye resembles that of the mole-rat; its ear is covered with flesh, and its skin is of a pinkish white. The *Siren* *Lacertina* is three feet long, and its tail is like an obtuse fin. It lives in the marshes of Carolina, especially rice fields, and eats insects, earth worms, &c.

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#### CLASS IV. FISHES.

FISHES are vertebrated animals with red, but cold blood, breathing by branchiæ instead of lungs, through the medium of water. Their general form is calculated to assist them in their progression through the liquid in which they live, but is modified to infinity; and any one throwing even a hasty glance over the tables which accompany this work, will see how the Creator of all things has been pleased, in this instance, to vary details, while he has adhered to one great

plan. Their blood is cold in consequence of the small quantity of oxygen which they receive from the water passing through their respiratory organs, and their senses and movements therefore are less acute and vigorous than in Mammalia and Birds. Their brain, in accordance with this, is proportionably small, and, having no elastic air at their disposal, they are, with rare exceptions, perfectly mute. Their eyes are nearly immovable, their face bony and fixed; their ear, inclosed in a portion of the skull, and deprived of those parts which give it so much sensibility in other animals, does not allow them a nice distinction of sounds. Seizing their prey as they swim, and swallowing it in haste, a delicate taste would have been useless; and their tongue, almost without movement, often covered with bony plates or teeth, and receiving only a few very small nerves, shows that this sense is blunted. Their nostrils, constantly traversed by water, instead of the subtle vapours floating in the air, cannot afford them much power of smell. Their touch, (a sense which is so widely distributed in Mammalia,) enveloped as they are in thick, scaly, or bony coverings, and their members enveloped in dry membranes, is confined to their lips; and these are often bony and insensible. They are almost all oviparous, and abandon their eggs as soon as they are laid; therefore they have no young to feed, and seldom to defend; and they are voracious, silent animals, incapable of answering any efforts which may be made to inspire them with attachment. They vary in size, from the enormous shark to the tiny minnow;

but it is to their generally elegant proportions; the lustre, delicacy, and diversity of their colours; the amusement which they yield to the sportsman; and the wholesome and delicious food which they afford for the table, that they owe their interest with man. The Romans spent incredible sums upon them, and no epicurean feast was complete without their costly presence.

The two first great divisions, or series, depend on the structure of their bones, which are either as hard, or harder than those of other animals, or are wholly or partially cartilaginous (see TABLE LVII.).

### TABLE LVII.

#### CLASS IV. PISCES. *Fishes.*

Series 1. FISHES PROPER. — Hard-boned fishes.

Series 2. CHONDROPTERYGII. — Cartilaginous fishes.

##### Series 1.

Order 1. ACANTHOPTERYGII. — The first portion of the dorsal fin, or the whole of the first dorsal when there are two, supported by spiny rays, the anal fin also having some spines, and the ventrals at least one each.

Order 2. MALACOPTERYGII ABDOMINALES. — All the rays of the fins soft, sometimes excepting the first of the dorsal or pectorals; ventral fins placed under the belly, and behind the pectorals.

Order 3. MALACOPTERYGII SUBRACHII. — Rays as above; ventrals placed under the pectorals.

Order 4. MALACOPTERYGII APODI. — Body long; no ventral fins.

Order 5. **LOPHOBANCHIAE.** — Branchiæ arranged in pairs of small tufts.

Order 6. **PLECTOGNATHES.** — Jaws immoveable.

Series 2.

Order 1. **CHONDROPTERYGII** with free branchiæ.

Order 2. **CHONDROPTERYGII** with fixed branchiæ.

The head of Fishes Proper has many more separate pieces than that of Mammalia. The valves which open

and close the gills, or branchial openings, alone contain several distinct portions, viz. the preoperculum, which lies nearest the front of the head (see the above figure, No. 6.), the operculum (9), beyond the upper part of the preoperculum, the suboperculum (8), and the interoperculum (7), to which the tongue bone (4) is attached. Under the fore part of the eyes are some flat bones, called the suborbitals (11), which often supply

the naturalist with a distinguishing character. The opening to the branchial cavity lies between the head and shoulder, and is further closed by a membrane, adhering to the tongue bone, and supported by bones, also attached to the tongue bone, and which are called branchial rays (5).\* This tongue bone plays an important part, for as it rises or falls, it moves the branchiæ, lower jaw, and opercula. The branchiæ themselves are formed of a great number of thin, membranaceous, or cartilaginous plates, generally forked, and placed in a row, one after the other like the teeth of a comb, and are ordinarily four in number, supported by four arched bones, themselves moveable, and their internal surface provided with little cones, or bony plates, generally armed with teeth, which serve to arrest the substances swallowed by the fish, and prevent them from going out with the water of respiration, or being entangled in the bony plates. The jaws, and the whole of the surface on the inside of the upper jaw, are more or less armed with teeth of various shapes and sizes; and only some species are wholly without. These serve to tear the food as it passes through the mouth, or to grasp the prey; but a much more powerful instrument of mastication lies at the entrance of the pharynx or gullet, immediately behind the branchial apparatus. It is formed of the pharyngeal bones, generally two below, and six above, all variously armed with teeth.

\* At 10 is the bone of the nose; 12 the orbit of the eye; 1 and 2 the upper jaw, formed of the maxillary (2), and the intermaxillary (1) bones; 3 the lower jaw.

Those above are immoveable, but those below dilate or contract the entrance to the gullet according to the movements of the branchial arcs, at the same time that they act upon the food.

The vertebræ are hollowed into a cone at both ends, and come in contact at the broad end of each. The space thus formed is filled with a soft, gelatinous, and membranaceous matter, which passes through the vertebræ by means of a hole, and threads them in the manner of spinal marrow, a substance which is never found in fishes. The vertebræ possess a variety of crests or projections which diminish towards the tail, and vary to infinity in number, length, breadth, &c. The ribs adhere to these vertebræ, and in some species meet under the belly, and often have a branch, or branches issuing from them in some part of their length; other branches proceed from the body of the vertebræ, and all enter into the flesh. A good example of their number will be found in the herring. If any sternum exist, which is most rare, it is formed of the pieces, almost external, which unite the lower ends of the ribs. The upright or vertical fins are the dorsal, anal, and caudal, all supported by rays which form a part of the skeleton. Each ray is composed of an interspinal bone, which penetrates into the great muscles of the side, and serves as a root to the upper part. The rays are articulated into these, so as to diminish or expand the fin at will, and those of the back are inserted between the projections of the vertebræ. The rays are mostly divided into two portions in their whole length, but firmly united;



some represent spines or spikes, and are solid the whole way, while others are only solid at the base, and the rest is formed of a multitude of little joints, or articulations, often subdivided into branches. The rays of the caudal fin are in two sets, and all the long ones are soft and articulated, but at the base on each side are some short rays, consisting only of the solid part. The upper portion of this fin generally has one ray more than the lower. The pectoral and ventral fins represent the limbs of other animals, and are formed of rays similar to those above described, but articulated into bones which represent the wrist, instep, &c. of quadrupeds. All the fins are liable to infinite varieties of form and position, and some fishes do not possess the whole number.

The eyes of Fishes have no real eyelids, and but little motion; their pupil rarely has the power of dilating and contracting, and although they see their prey at a distance, their vision is imperfect. Their ears also, being of a less complicated nature than those of Mammalia, render their hearing defective; nevertheless they are frightened at sudden and strange noises, obey the call which summons them to a repast, and the Romans asserted that they recognised their individual names. Their nostrils, situated in different parts of the head according to its form, are furnished with peculiar muscles, to open or close them at pleasure, and lined with the pituitary membrane; and on the number and extent of the folds of this membrane must depend the extent of their smell. Their tongue is short, and even when it is

most fleshy is not of a nature to convey delicate sensations; it is not moistened by saliva, or capable of flexion and extension, and in some is wholly wanting, but it is supposed that parts of the palate and pharynx occasionally supply the deficiency. It is singularly irritable, swells for several instants when pricked, that of the carp evincing this property even after death. Scales are either horny, or of a composition in which lime bears a great proportion. Those of the lateral line are often different to the rest and are perforated by little tubes. These are outlets to an apparatus within, which secretes a fluid.

The circulation of the blood in Fishes is double, and their respiration is effected by means of a multitude of little vessels which are spread over the branchial plates, and there receive the oxygen contained in the water which they have swallowed, and which passes through the branchiæ, and out at the gills, or branchial openings. There are some, however, which are obliged to breathe air itself; come to the surface for that purpose, and quickly die if kept at the bottom of the water. When fishes perish out of water it is not for want of oxygen, but because their branchiæ become dry, and the blood does not circulate in them; consequently those which have wide gills die soonest, and those in whom its opening is much reduced, or possess the power of retaining water in some receptacle for the purpose, live the longest. Most fishes, although the exceptions are numerous, have what is called a swimming bladder, in which air is secreted. It is sometimes simple in

form, at others divided into two or more lobes. It affords the best isinglass, is supposed to maintain the equilibrium of the fish in the water, and enables it to ascend and descend; for those in whom it is burst are unable to rise to the surface.

The repetition of technical terms, although it renders every description more concise, has been as much as possible avoided, both in the tables and in the body of this work; but as several have of necessity been employed in the present instance, it is advisable to preface the use of them by explanation. The appellations of the fins, according to their position on the body, have been retained, while the word "fin" has been generally excluded. The term "soft teeth" has been substituted for "en velours," as the translation, "like velvet," scarcely conveys an idea of their nature. Canine teeth are not always in the same position as those of Mammalia, but resemble them in shape and proportion. The term, "like pavement," need scarcely be explained; but the teeth which compose it are of all sizes, and various shapes, such as flat, rounded, &c. Depressions may be compared to dimples. Free rays, or spurious fins, have either no membrane attached to them, or, if they have, it does not adhere to the next spine. The branchial rays support the membrane, which, with the opercula, covers the branchial opening. The word "compressed" signifies squeezed together vertically, or sideways; "depressed" means squeezed together horizontally; "ciliated" is that very fine division of an edge, or termination which resembles

eyelashes; the "lateral line" is that mark along the side which is perceptible in almost all fishes; "keeled" is a brief way of saying, a narrow and sharp ridge like the keel of a vessel; and "armed" means either provided with spines, or plates like armour.

It is equally difficult to attach interest to a history of fishes and to establish clear and marked divisions between them. So many affinities exist with differences, that even the distribution into orders is subject to exceptions. These are eight in number, including the Cartilaginous Fishes; and the first, that of *Acanthopterygii*\*, is composed of a multitude of strange forms and exquisite colours. Its principal characters and its subdivisions will be seen in the tables (see TABLE LVIII.).

### TABLE LVIII.

#### CLASS IV. PISCES.

##### Series I. FISHES PROPER.

#### ORDER I. ACANTHOPTERYGII.

**Family 1. PERCOIDES.** — Body oblong, covered with hard, or rough scales; the operculum, or preoperculum, or both, provided with teeth or spines; teeth on the jaws, and inside the mouth.

**Family 2. JONES CUIRASSÉES.** — Head differently prickled and armed; the suborbital bones extend more or

\* Some of the rays of the fins like stiff spines, others flexible; from the Greek for thorn, &c.

less over the cheek, and are articulated into the preoperculum.

Family 3. SCIENOIDES. — Teeth on the preoperculum; spines on the operculum; no teeth within the mouth; muzzle generally enlarged; upright fins often scaly.

ISOLATED GENUS. ATHERINA.

Two dorsal fins very wide apart; ventrals behind the pectorals; mouth very protractile, provided with very small teeth; a wide, silvery band on each side of the body.

GENUS IV. SPAROIDES.

No teeth on the palate; six branchial rays; no teeth on the preoperculum, and no spines on the operculum.

GENUS V. MENIDES.

Upper jaw protractile and retractile; other characters like those of the two preceding families.

ISOLATED GENUS. APHAREUS. *Foutak, Farès*.

Operculum obtuse; mouth widely cleft; last ray of the dorsal and anal fins double the length of those which precede them.

GENUS VI. SQUAMMIPENNES.

The soft, and sometimes the spiny part of the dorsal and anal fins covered with scales; body much compressed.

GENUS VII. PHARYNGII. *Labyrinthiformes*.

Upper pharyngeal bones divided into small, irregular leaflets, more or less numerous, and which have the power of retaining the water destined to pass through the branchiæ.

GENUS VIII. SCOMBEROIDES.

Body smooth; scales small; tail and caudal fin very vigorous.

GENUS IX. THEUTYS. *Teuthies*.

Body compressed, oblong; mouth small, very little or not at all protractile; one row of cutting teeth on each jaw; none within the mouth; one dorsal fin.

GENUS X. TÆNIOIDES. *Ribbon-fishes*.

Body very long, and flattened at the sides; scales very small.

## GENUS XI. MUGILOIDES.

Body cylindrical, covered with large scales; two separate dorsal fins; ventral fins placed a little behind the pectorals; six branchial rays.

## ISOLATED GENUS. TETRAGONURUS.

Two projecting crests on each side of the base of the tail; dorsal fin very long and shallow; jaw teeth sharp and pointed, like a saw, fitting in between each other when the mouth is closed; pointed teeth within the mouth.

## GENUS XII. GOBIOIDES.

Very thin, flexible spines in the dorsal fin; no swimming bladder.

ISOLATED GENUS. CHIRUS. *Labrax*.

Body long, provided with ciliated scales; head small; mouth small, and having small, irregular, conical teeth; dorsal fin all along the back with thin spines; ventrals with five soft rays; several series of pores on the sides, looking like several lateral lines.

GENUS XIII. PECTORALES. *Pediculatæ*.

The bones which support the pectoral fins prolonged into a sort of arm, or stem.

## GENUS XIV. LABROIDES.

Body oblong, scaly; the first part of the dorsal fin supported by spines, each often provided with a membranous shred; fleshy lips; teeth on the three pharyngeal bones.

GENUS XV. FISTULARIÆ. *Bouches en flute*.

A long tube in front of the head, formed by the prolongation of certain bones, at the end of which is the mouth.

Other orders invade these characters, and some of the Acanthopterygii themselves possess them in so modified a degree, that they are scarcely to be recog-

nised; yet the groups have such multiplied affinities between themselves that it is impossible to avoid classing them together. The first family is that of the Percoides (see TABLE LIX.), so named from the great genus Perch, which forms its type. It abounds in species, the greater number of which frequent warm climates, and generally yield a wholesome food.

## TABLE LIX.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER I. ACANTHOPTERYGII.

## FAMILY I. PERCOIDES.

Division 1. Ventrals under the pectorals; five soft rays in the ventrals; seven branchial rays; two dorsals, or one deeply notched; teeth soft.

GENUS I. PERCA. *Perch, Perches.*

Preoperculum dentated; operculum bony, ending in two or three sharp points; tongue smooth.

GENUS II. LATES. *Varioles.*

Teeth of preoperculum very strong, and a strong spine at its angle; strong teeth on the suborbital and shoulder bones.

## GENUS III. ENOPLSUS.

Strong teeth at the angle of the operculum; no spine on the shoulder.

## GENUS IV. DIPLOPRIONS.

A double row of teeth at the bottom of the preoperculum; operculum with three spines.

GENUS V. LABRAX. *Basse, Sea-perch, Bars, Loups, Loubine.*

Two spines on the operculum ; soft teeth on the tongue.

GENUS VI. CENTROPOMUS.

Operculum obtuse and entire ; preoperculum dentated ; dorsals separated.

GENUS VII. GRAMMISTES.

Scales small ; spines on the opercula ; no visible spine to the anal.

GENUS VIII. ASPRO. *Aprons.*

Dorsals far apart ; ventrals large ; muzzle swelled and projecting.

GENUS IX. AMBASSIS.

A spine lying down before the first dorsal ; preoperculum doubly dentated ; dorsals close to each other ; operculum ends in a point.

GENUS X. APOGON. *Roi des Rougets.*

Large and easily falling scales ; preoperculum doubly dentated ; dorsals far apart.

GENUS XI. NIPHONS.

Strong spines at the bottom of the opercula.

GENUS XII. HURO.

No teeth on the preoperculum.

Subdivision 1. — *Canine teeth mixed with the others.*

GENUS I. CHEILODIPTERUS.

Preoperculum doubly dentated ; dorsals far apart ; scales large.

GENUS II. LUCIOPERCA. *Sandret, Brochet-perches.*

One row of teeth to the preoperculum ; teeth resembling those of the pike ; dorsals far apart.



GENUS III. ETELIS.

Jaw teeth crook'd; teeth of preoperculum scarcely visible; dorsals contiguous.

Division 2.

One dorsal; canine teeth mixed with others.

GENUS I. SERRANUS. *Serrans.*

Preoperculum finely dentated; operculum with two or three spines; no scales on the jaws.

Subgenus 1. ANTHIAS. *Barbiers.* — Scales on the jaws and end of muzzle.

2. MEROUS. — Fine scales on the lower jaw.
3. PLECTROPOMA. — Preoperculum dentated; operculum spiny; the teeth of the former, at the bottom, like spikes.
4. DIACOPE. — Preoperculum dentated; a deep notch at its angle to receive a tubercle on the interoperculum; the dorsal spines hidden by the scales at will.
5. MESOPRION. — Preoperculum dentated; operculum ending in a flat, blunt angle, and no spines.
6. APRION. — Two small points to the operculum; preoperculum plain; last ray of dorsal longest; membranes between the rays scaly.

Subdivision 1. — *All the teeth soft.*

GENUS I. CENTROPRISTIS.

Operculum spiny; preoperculum dentated.

GENUS II. GRYSTES. *Growlers.*

Preoperculum entire; operculum spiny.

GENUS III. POLYPRION. *Cerniers.*

Dentated crests on the operculum, suborbital, &c.

## GENUS IV. PENTACEROS.

Scales hard and close, and bearing horns; suborbital dentated; a horn above each eye; roughnesses on the skull; opercula striated.

GENUS V. ACERINA. *Gremilles.*

Depressions in the bones of the head; small spines on the opercula.

GENUS VI. RYPTICUS. *Savonniers.*

Head smooth; small scales hidden under a thick skin; small spines on the opercula; only the vestige of a spine in the anal fin; only three or four in the dorsal.

## GENUS VII. APSILUS.

No spines or teeth on the opercula.

Subdivision 2. — *Canine teeth mixed with the others.*

## GENUS I. CIRRHITES.

Six branchial rays; lower rays of pectorals simple and partly free.

## GENUS II. APLODACTYLUS.

Six branchial rays; pectoral rays as above; preoperculum entire; ventrals placed far back; scales small; three rows of rounded and notched teeth on the upper jaw; two on the lower.

Subdivision 3. — *No canine teeth.*

## GENUS I. CHIRONEMUS.

Pectorals like those of the Cirrhites.

## GENUS II. POMOTIS.

A membranous prolongation of the operculum; three anal spines.

GENUS III. BRYTTUS.

A narrow band of soft teeth on the outer edges of the palate.

GENUS IV. CENTRARCHUS.

Fine, soft teeth on the tongue; nine anal spines; other characters as Pomotis.

GENUS V. APHREDODERUS.

Head flattened above, suborbital dentated and spiny; preoperculum dentated; spine at the angle of the operculum; no ventral spines.

GENUS VI. TRICHODONS.

Strong spines round the preoperculum; no scales; mouth almost vertical.

GENUS VII. PRIACANTHUS.

Body, head, and jaws covered with small, rough scales; spine of the preoperculum flat and dentated.

GENUS VIII. DULES. *Doules*.

Operculum ending in flat spines; preoperculum dentated.

GENUS IX. THERAPON.

Preoperculum dentated; operculum spiny; dorsal much notched between the soft and spiny parts; outer row of teeth strong and pointed.

Subgenus 1. DATNIA. — No palate teeth; dorsal less notched.

2. PELATES. — Operculum ending in two points; preoperculum dentated; dorsal slightly notched; soft teeth.

3. HELOTES. — Dorsal deeply notched; outer row of teeth with three lobes.

GENUS X. NANDUS.

Mouth very protractile; teeth soft; preoperculum and interoperculum finely dentated; small spine on the operculum.

## Division 3.

More than five soft rays in the ventrals; more than seven branchial rays.

## GENUS I. MYRIPRISTIS.

Two dentated crests on the preoperculum; no spines; two dorsals, or one deeply notched; scales dentated.

## GENUS II. HOLOCENTRUM.

A strong spine on the preoperculum; dorsal much notched, suborbital, shoulders, opercula, and scales all dentated.

Subdivision 1. — *Six branchial rays.*

## GENUS III. BERYX.

No spines on the preoperculum; one short dorsal on the back; the foremost spines weak; eye enormous.

## GENUS IV. TRACHICTYS.

Dorsal as above; a flat spine at the bottom of the preoperculum, and one on the shoulder; large, keeled scales on the belly and sides of tail; eye enormous.

## Division 4.

Ventrals before the pectorals; teeth soft.

## GENUS I. URANOSCOPUS.

Eyes on the upper surface of the head, looking upwards; head thick, hard, and flattened; a strong spine on each shoulder; preoperculum with a zig-zag edge; a long, narrow strip of flesh within the mouth and before the tongue, which issues at will; a strong spine on each shoulder; six branchial rays.

GENUS II. TRACHINUS. *Weaver, Vives.*

Head compressed; a strong spine on the operculum; mouth oblique; first dorsal very short, second long; pectorals large.

GENUS III. PERCIS.

Head flattened; no teeth on the palate; hook'd teeth in front of jaws; first dorsal united to the long second.

GENUS IV. PINGUIPES.

Lips fleshy; ventrals thick.

GENUS V. APHRITIS.

Two dorsals, far apart, and of unequal length.

GENUS VI. BOVICHTUS.

Seven branchial rays; head thick and short; two dorsals, the first supported by slender rays.

Subdivision 1. — *Canine teeth mixed with the others.*

GENUS I. PERCOPHIS.

Lower jaw pointed; one long dorsal; body long and cylindrical.

Division 5.

Ventrals on the belly, or behind the pectorals; canine teeth.

GENUS I. SPHYRÆNA.

Dorsals wide apart; preoperculum dentated; lower jaw longer than the upper; opercula plain; seven branchial rays.

GENUS II. PARALEPIS.

Characters as above, but second dorsal very small and fragile.

Subdivision 1. — *Soft teeth.*

GENUS I. POLYNEMUS.

Muzzle enlarged; free rays under the pectorals, which are sometimes very long.

GENUS II. SILLAGO.

Dorsals contiguous; crests on the suborbitals and preoperculum; muzzle projecting.

## Division 6.

Teeth varying ; barbs ; large scales on the head, which easily fall ; dorsals far apart.

GENUS I. MULLUS. *Mullet.*

Dorsals wide apart ; body and opercula covered with wide scales which fall easily ; preoperculum plain ; mouth small ; teeth feeble ; two long barbs under the chin.

Subgenus 1. MULLUS PROPER. *Rougets. Barbets.* — Three branchial rays ; operculum plain ; two plates of flat teeth in the mouth.

2. UPENEUS.— A small spine on the operculum ; teeth on the jaws, none on the palate ; four branchial rays.

The Perch of this country is one of the most beautiful of fresh-water fishes, with rich and brilliant colouring, and magnificent fins, scales and spines. It is very voracious, and preys chiefly on small fishes, from one of which, the Stickleback, it often receives its death, as the spines stick in its throat. It is even said to devour young water rats : a number of pores or orifices, from which a mucous secretion exudes, are to be found in the head, from whence, and from the lateral line, it is spread over the whole body. It is subject to a deformity like a hump back, and which is chiefly to be met with in North Wales. The Laplanders make a strong cement from its skin.

The Lates is one of the Nile fishes, and known in ancient times. It is reported to have occasionally weighed two hundred pounds ; and Strabo says, not only that it was worshipped by the Egyptians, but that the city of Latopolis, now Esné, was named after it.

The Labrax abounds in the Mediterranean, was esteemed by the Greeks, and bore the name of *Lupus* among the Romans, who thought its flesh a delicacy: one species is common in New York.

The Aspro, so called from the roughness of its scales, is the little fish of the Rhone, which the peasantry there gravely assert, lives on the grains of gold which it finds in the sand of the river.

The name of Growlers arises from the noise which these fishes are said to make.

Among the Acerinæ is that pretty little fish called the Pope or Ruffe in England, and which frequents the Thames, the Yare, and the rivers of the north of England. Their flesh is good eating; but they annoy the gudgeon fishers very much by taking their baits, who, in revenge, put a piece of cork on the strong spines of the first dorsal, and set them swimming again. With this affixed to them, they cannot of course sink, and soon die, as they live in the deepest waters.

From the peculiar position of the eyes, the *Uranoscopus* can only see objects above it. It is a solitary fish, lives in mud and sand in the Mediterranean and Indian seas, and its fleshy strap is supposed to attract its prey.

*Trachinus* signifies harsh and rough; and on the coasts of Provence this fish is called the Sea-spider, on account of its supposed venemous properties. It has a wide locality, and is said to live a long time out of the water. The story of its conveying poison into the wounds made by the spines of its dorsal fin and

operculum, probably arises from their depth ; for the fish bears no traces of any power of secreting poison. Fishermen, however, are much afraid of it, and generally contrive to cut off the spines before they bring the fish ashore. In France they are obliged by law to do so ; and in Spain, no fish can be brought to market without its strong spines (if it have any) being taken from it.

The *Sphyræna barracuda* attacks men when in the water, and is more dreaded than sharks, as it is not to be intimidated by noise or movement. It is from the West Indies and Brazil, and the effects which its flesh produces, when eaten in a poisonous state, are pains in the joints, and the falling off of the hair and nails, which symptoms continue for years. If salted, all its deleterious properties are destroyed.

The *Polynemus*, whose name means many threads, is said to attract its prey by means of the free rays under its pectorals. The species in which these are long inhabit the Indian seas, where they are called Mango fish, both from their colour and their coming to lay their eggs when this fruit is ripe. They and their spawn are said to be delicious eating.

The lateral line of the Mullet is marked by little diverging branches on each scale. Mullet Proper have always been celebrated for their flavour and beauty. The ancients called them *Triglé* from their being supposed to spawn three times in the course of the year. The Romans named them *Mullus* after the sandal denominated *Mulleus*, which the kings of Alba used to wear, which was continued through the



consulate and empire, and which they resembled in colour. During the latter period, when luxury was at its height, enormous sums were given for them, and it is recorded that 243*l.* sterling were paid for three of a good size, which caused Tiberius to make sumptuary laws, and tax the provisions brought to the market. The large mullets were caught in the sea, for they would not attain any size in ponds, although the Romans tried many experiments to effect this. They were often kept under the couches of the guests, and were scarcely deemed fresh unless they died in the hands of those at table, or in glass vases; where the different hues which they assumed in dying became a matter of entertainment. The liver and head are the parts most esteemed; the former is left inside the fish when cooked, and in some counties of England, from its flavour, procures it the name of the Sea Woodcock.

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#### FAMILY II. JOUES CUIRASSEES.

Suborbital bones, or those lying under the eye, extending over the cheeks.

In the second family of *Acanthopterygii*, the suborbital bones extend down the cheeks, so as partially, or entirely, to cover them, and join on to the preoperculum. They are thus encased in complete armour, and by some English naturalists are called Hard Cheeks. The first genus is that of *Trigla* (see

TABLE LX.), or Gurnard, which is strongly marked with the general characters. Not only is their suborbital large, but their preoperculum also, and these, and all the bony pieces of the upper part of the head and shoulders are hard, grained, or striated\*, and often provided with spines or sharp crests, so that few fishes have their heads better defended against the attacks of enemies. Their gills are large; their branchial rays seven in number; their pharyngeal teeth always soft; their body diminishes much towards the tail; their dorsal fins are placed in a furrow, and when they are taken out of the water, they make a noise, or grunting. The pectorals of some are so large as to enable them to rise from the water and remain in the air for some time.

## TABLE LX.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER I. ACANTHOPTERYGII.

## FAMILY II. JOUES CUIRASSÉES.

GENUS I. TRIGLA. *Gurnard, Grondins, Rougets.*

Suborbital bone covers the cheek and joins the preoperculum; sides and front of the head upright; two distinct dorsals; three free rays under the pectorals.

Subgenus 1. TRIGLA PROPER — Soft teeth on the jaws and in the mouth; pectorals large.

\* Having little points like grains, or striped with fine radiations.

Subgenus 2. PRIONOTES.—Pectorals long, capable of supporting the fish in the air; a band of soft teeth on the palate.

3. PERISTEDION. *Malarmat*. — Large, hexagonal scales all over the body, which form longitudinal ridges; muzzle divided into two points, with branching barbs underneath; no teeth.

GENUS II. DACTYLOPTERUS. *Flying Gurnards, Rougets volans, Hirondelles de mer*.

Long and numerous rays under the pectorals, united by a membrane, and so forming a supernumerary fin, longer than the fish, which supports it in the air; muzzle short, cleft like that of a hare; mouth underneath; teeth like pavement on the jaws; a flat, rectangular, grained head-piece or casque; preoperculum ending in a long, powerful spine; scales keeled.

GENUS III. CEPHALACANTHUS.

Characters as above, but no supernumerary fins.

GENUS IV. COTTUS. *Father-Lasher, Chabots de mer, Cha-boisseaux, Scorpions de mer, &c.*

Head wide and flattened, armed and set with spines, or tubercles; two dorsal fins; teeth within the mouth; six branchial rays, three or four in the ventrals; lower rays of pectorals not branching.

Subgenus 1.—ASPIDOPHORUS. *Agonus, Phalangista*. — Body armed with angular plates; no teeth.

GENUS V. PLATYCEPHALUS.

Ventrals large, having six rays placed behind the pectorals; head much flattened, sharp at the edges, armed with spines; seven branchial rays covered with scales; a row of sharp teeth within the mouth.

## GENUS VI. OPLICHTHYS.

Head of *Platycephalus*; body covered with bony pieces; ventrals placed a little before the pectorals, having five soft rays; pectorals large.

## GENUS VII. HEMITRIPTERUS.

Head flattened; two dorsals; no regular scales; teeth on the palate; prickles and spines on the head, besides shreds of skin; first dorsal deeply notched.

## GENUS VIII. HEMILEPIDOTUS.

One dorsal; teeth on the palate; longitudinal bands of scales on the body; thick skin, covering them when wet.

## GENUS IX. BEMBRAS.

Head armed like that of the *Platycephalus*, but not flattened; ventrals before the pectorals, having five soft rays; soft teeth on the jaws and within the mouth; dorsals separate.

## GENUS X. SCORPÆNA.

Head armed, prickly, and compressed at the sides; body covered with scales; seven branchial rays; one dorsal fin; lower rays of pectorals articulated and simple, or not branching.

Subgenus 1. SCORPÆNA PROPER. *Rascasses*. — Head spiny and tuberculous; no scales; soft teeth on the jaws and palate; shreds of skin on different parts of the body.

2. TÆNIANOTES. — Body much compressed; dorsal fin very deep, and united to the caudal.

3. SEBASTES. — Head less prickled and scaly; no shreds of skin.

## GENUS XI. PTEROIS.

Like *Scorpænæ* Proper; no teeth on the palate; dorsal and pectoral rays excessively long.

## GENUS XII. BLEPSIAS.

Head compressed; cheeks armed; fleshy barbs under the lower

jaw ; five branchial rays ; ventrals very small ; dorsal with three deep notches.

GENUS XIII. AGRIOPUS.

No suborbital spines ; dorsal deeper than above, and advancing between the eyes ; muzzle narrow ; mouth small ; no scales ; two lateral crests on the head, rising like two walls.

GENUS XIV. APISTES.

Teeth on the palate ; few rays in the pectorals, and all branching ; a strong spine on the suborbital bone, which projects from the cheek.

GENUS XV. MINOUS. *Woorra, Minoo.*

Suborbital spines as above ; one free ray under the pectorals ; no teeth on the palate ; soft teeth on the jaws ; seven branchial rays.

GENUS XVI. PELOR.

Dorsal undivided ; teeth on the palate ; no scales ; two free rays under the pectorals ; head as if crushed in front ; eyes near together ; dorsal spines long and almost free ; form monstrous.

GENUS XVII. SYNANCELA.

Form as hideous as above ; head rough, tuberculous, not compressed, and often covered with a loose, spongy skin ; all the pectoral rays branched ; dorsals undivided ; no teeth within the mouth.

GENUS XVIII. MONOCENTRIS. *Lepisacanthus.*

Free spines instead of a first dorsal fin ; projecting ridges on the head, the spaces between them filled by a transparent membrane ; mouth cleft nearly as far as the eye ; fore teeth on each jaw and in the palate ; eight branchial rays ; scales angular, wide, rough, and finely dentated at the edge, forming armour for the whole body, which is short and thick.

## GENUS XIX. HOPLOSTETHUS.

Muzzle a little enlarged, front made convex by ridges of bone, the intervals between which are covered with a thin, transparent skin; suborbital crested in the same way, joining similar ridges on the preoperculum, the edge of which is thin and zigzag; the operculum marked with rough lines, one of which ends in a spine; a flat, rough spine on the shoulder; a slight roughness instead of teeth on the jaws and palate, the lower jaw ends in a tubercle which fits into a notch of the upper jaw; soft teeth on the pharyngeal bones; eight branchial rays; ventrals placed under the pectorals; caudal divided into two lobes; scales on the back rough; between the ventrals and anals are eleven scaly pieces with keels, each terminated by a short and pointed spine.

GENUS XX. GASTEROSTEUS. *Sticklebacks*, *Epinoches*.

Head without tubercles or spines; cheeks armed; dorsal spines free; bony plates on the belly; ventrals behind the pectorals almost reduced to a single spine; three branchial rays.

## GENUS XXI. OREOSOMA.

Body oval, provided above and below with thick cones of a horny substance, four on the back, ten on the belly in two rows, and smaller cones between two spines on the operculum; seven branchial rays; two dorsals.

The pectorals of the Prionotes, long mingled with the Triglae, surpass those of the latter, and consequently they are able to fly farther; but the flight of all flying fishes rather resembles enormous leaps, than positive volition.

The suborbital of the Dactylopterus is so joined to the preoperculum as to be moveable, and the fish is thus enabled to use the enormous spine with which the latter is provided. One species, called the Sea-

swallow, is said to fly farther than any other fish, and is well known in the Mediterranean and warm coasts of America, &c. All travellers speak of the rapidity with which it rushes from the water when pursued by its enemies, the bonita, dolphin, &c. and the liability which it then incurs to be eaten by the oceanic birds. Directly its wings are dry, it is obliged to dip them into the water, in order to keep them expanded; and these are made more pliant by being attached to a thick, short, fleshy stem, instead of proceeding immediately from the body.

The little, strange-looking fish, called Miller's-thumb, or Bull-head, abounding under stones in most of our rivers, and those of other parts of Europe, is one of the genus *Cottus*. It has received its first name from its supposed resemblance to the thumb of a miller, which, it is well known, is apt to become large and flat from constantly rubbing the meal. Many persons assert that this little fish, after having deposited its eggs in a hole worked by itself in the sand, watches close by till the young ones are hatched. The marine *Cottus*, known under a variety of names, such as Father-lasher and Sea Scorpion, is in form, an exaggeration of the Miller's-thumb. It lives a long time out of water, makes a noise when taken, or when squeezed, and swims with the greatest rapidity. That of Kamtschatka, called Little Bull by the natives, is distinguished by its long, dentated spines, is one of the most hideous of all fishes, and dies directly it is plunged into fresh water.

For ugliness and strangeness of form, and for

strength of spines, the Scorpeneæ rank foremost among fishes; and their deep, brilliant, and, at times, extraordinary colouring, serves to render their appearance still more ferocious. They abound in various seas; but those of India seem to outdo all others in appearance.

The Apistes is the only flying fish of the Red Sea, where the Arabs call it the Sea Grasshopper. The learned Professor Ehrenberg is of opinion that this fish, and not the quail, nourished the Israelites in their journey; the translators having erroneously interpreted the Hebrew word.

It would be difficult to convey a just idea of the appearance of the Pelor filamentosum without the assistance of a coloured drawing; for its concave profile, only interrupted by its projecting eyes; its crested and ill-proportioned head; its body covered with loose shreds of skin and tumours; its swollen belly; its dorsal spines, branching into little, free filaments at the top; its ventrals, attached to the body and reduced to mere ridges, and its unusual colours, penetrating even into the mouth, make it unique among fishes. It is in some measure imitated by the genus Synanceia, a species of which, among other strange fishes, looks like a misshapen mass of corrupted jelly. The skin which envelopes it is wrinkled, full of warts, slimy, and disagreeable to the touch; its dorsal looks like a row of tubercles rather than a fin; the pectorals surround the neck like a ruff, and the natives of the Isle of France look upon it rather as a reptile than a fish, and dread a wound from its



spines more than they would the bite of a serpent or scorpion. This arises, not only from their depth, but from the viscous matter which penetrates along with the spine.

The name of *Gasterosteus*, bestowed on the little Stickleback, is intended to express the bony armour which covers the belly. All the species are small, and abound in the spring, in most of the streams of Europe, when the males assume the most brilliant colours. They are all active, but the latter are very quarrelsome, fight with their spines, tear open the bodies of their antagonists, and pursue them till quite exhausted. They have occasionally been so abundant in the fens of Lincolnshire that they have been used for manure. It would seem that this circumstance is periodical, and no positive reason can be assigned for it. The ten-spined Stickleback is a native of the sea.

The body of the *Oreosoma* is as deep as it is wide, and studded all over with cones like little sugar loaves. Its name signifies body and mountain; and Baron Cuvier compares it to a little map of a volcanic country.

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### FAMILY III. SCIENOIDES.

No teeth within the mouth; muzzle swelled.

The *Scienoides* (see TABLE LXI.) have the same habits as the *Percoides*, and are equally useful to man.

They are remarkable for the variety of form presented by their swimming bladders, and although these do not appear to have any communication with the exterior, it is difficult to think otherwise than, that they influence the noises and gruntings, which in the Scienoidæ are much louder and more frequent than among the Triglæ.

## TABLE LXI.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER I. ACANTHOPTERYGII.

## FAMILY III. SCIENOIDES.

Division I. *Two dorsal fins.*

## GENUS I. SCIÆNA.

Head convex ; supported by hollow bones ; the soft parts of the dorsal fins longer than the spiny parts ; short anal ; preoperculum dentated ; operculum ending in points ; seven branchial rays ; whole head scaly ; no teeth on the palate.

Subgenus 1. SCIÆNA PROPER. *Maigres*.—Weak spines to the anal fin ; no long teeth or barbs.

2. OTOLITHUS. — Spines as above ; no barbs ; some of the teeth like long hooks or canines.

3. ANCYLODON. — Muzzle very short ; canines excessively long ; tail pointed.

Subgenus 4. *CORVINA*. *Corbs.*—No canines; no barbs; all the teeth soft; second anal spine, thick and powerful.

5. *JOHNIUS*.—Second anal spine more feeble than the above, and shorter than the soft rays.

6. *LEIOSTOMUS*.—Anal spine small and feeble; pharyngeal teeth like pavement; scales ciliated.

#### GENUS II. LARIMUS.

Muzzle very short and flat; soft teeth on the jaws; none on the palate; head scaly, also the lower jaw; seven branchial rays; operculum ending in two hidden points; second spine of the anal strong; eye large.

#### GENUS III. NEBRIS.

Muzzle longer than above; eye much smaller; soft teeth in the jaws and pharyngeal bones; upper jaw much enlarged; head scaly; bony ridges on the suborbital and preoperculum; operculum with a flat, sharp point; seven branchial rays; two short and feeble spines on the anal.

#### GENUS IV. LEPIPTERUS.

Muzzle prolonged; forehead concave; soft teeth; dorsal and caudal fins scaly; thick anal spine; opercula scaly; preoperculum dentated.

#### GENUS V. BORIDIA.

Large, blunt teeth on the jaws in three or four rows; preoperculum slightly zigzag at the edge.

#### GENUS VI. CONODONS.

Conical teeth on each jaw, the six in front stronger and more powerful than the others; a band of soft teeth behind them. Teeth on the preoperculum very strong; second spine of the anal very strong.

## GENUS VII. ELEGINUS.

Preoperculum entire; mouth small; anal long; very wide pectorals; ventrals placed before them; six branchial rays; a narrow band of fine teeth on the jaws.

GENUS VIII. EQUES. *Chevaliers*.

Body long and compressed, raised at the shoulders, and finishing in a point; teeth soft; first dorsal deep, the second long and scaly.

## GENUS IX. UMBRINA.

A small barb under the chin; muzzle obtuse, longer than the lower jaw; soft teeth on the jaws; and pharyngeal bones; operculum ending in two flat points.

Subgenus 1. LONCHURUS.—Caudal pointed; two barbs on the chin.

GENUS X. POGONIAS. *Drums, Tambours*.

Several barbs upon the chin; muzzle thick and obtuse; teeth on the jaws; large teeth like round projecting pavement on the pharyngeal bones; dorsals united by a shallow membrane; seven branchial rays; second spine of anal long.

## GENUS XI. MICROPOGON.

Barbs extremely small; nape of the neck convex; anal spine moderate; preoperculum dentated; operculum ending in two flat spines; four small lobes at the end of the muzzle; mouth protractile; teeth soft.

Division II. *One dorsal fin; seven branchial rays.*GENUS I. HÆMULON. *Gorettes, Gueule-rouge*.

Profile long; lower jaw compressed; two pores and a depression under the chin; teeth soft; inside of the lower lip of a brilliant red and orange; dorsal a little notched; scales on the soft part; preoperculum dentated.

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### **GENUS II. PRISTIPOMA.**

Pores and preoperculum as above; muzzle more enlarged; mouth smaller; no scales on the dorsal; operculum has a blunt angle hidden under the membrane.

### **GENUS III. DIAGRAMMA.**

Pores under the chin, but no depressions; two larger pores under the jaws; other characters as above.

*Division III. One dorsal; less than seven branchial rays.*

### **GENUS I. LOBOTES.**

Muzzle short; lower jaw projects; body deep; end of dorsal and anal prolonged, so as with the caudal to form three lobes; four groupes of very small points towards the end of the jaw.

### **GENUS II. CHEILODACTYLUS.**

Body oblong; mouth small; numerous spiny rays in the dorsal; lower rays of pectorals simple, and prolonged beyond the membrane.

### **GENUS III. SCOLOPSIDES.**

Suborbital dentated, and ending near the orbit in a point, directed backwards, which crosses with another point directed forwards; body oblong; mouth small; teeth soft; scales large; no pores.

### **GENUS IV. LATILUS.**

Muzzle very short; eye large; mouth cleft to under the eye; two small projections between the nostrils and the end of the muzzle; upper jaw protractile; teeth in it soft, with from four to six in front, which are longer and crook'd; five teeth in the front of lower jaw; four to five crook'd on each side; tongue attached to the sides; operculum, cheek, and skull scaly; six branchial rays; pectorals and ventrals pointed.

## GENUS V. MACQUARIA.

Bones of the head hollow; no teeth; five branchial rays; muzzle obtuse; a depression in the forehead, one in front of each eye, two between the nostrils, five or six below the eye, &c.; small pores, and a depression at the end of the lower jaw; opercula finely dentated; five branchial rays; second spine of anal the strongest.

Division IV. *Less than seven branchial rays; lateral line interrupted.*

## GENUS I. AMPHIPRION.

Opercula dentated; two of the three pieces furrowed; a single row of obtuse teeth.

## GENUS II. PREMNAS.

Preoperculum dentated; one or two strong spines on the sub-orbital.

## GENUS III. POMACENTRUS.

Preoperculum dentated; a single row of cutting teeth

## GENUS IV. DASCYLLUS.

Soft teeth; characters as above.

## GENUS V. GLYPHISODON.

Opercula plain; a single row of cutting teeth, often notched.

## GENUS VI. ETROPLUS.

Eye placed higher than those of the same family; part of dorsal and anal pointed; the latter having several spines.

## GENUS VII. HELIASES.

Preoperculum entire; scales large; lateral line terminating under the end of the dorsal; soft teeth.

The species of *Sciæna* called the Maigre attains a considerable size, and was in former times much esteemed for the table, and its head offered by the Roman fishermen to the authorities of the city. It has now fallen into disrepute, but with other *Scienoidæ* yields a wholesome food. When they swim in numbers, their gruntings, according to the fishermen, may be heard from twenty fathoms deep, and their appearance is said to announce the arrival of the yearly shoals of herrings. They have unusually large bones in the ear, to which medical virtues were ascribed by the superstitious of other days, and were occasionally worn, set in gold.

Baron Humboldt relates, that in the South Sea, at about seven in the evening, the whole crew of the vessel in which he sailed was alarmed by an extraordinary noise, resembling that of drums, in the sea, in the air, and apparently in the vessel itself. It was at first attributed to breakers, and when it was accompanied by a bubbling sound, it was much feared that the ship had sprung a leak, but at nine o'clock the noise entirely ceased. It is now supposed that this circumstance may be explained, by referring the noise to the fishes called *Pogonias*, which in America are named Drums, and which are well known on those shores for the booming, hollow, sound which they produce.

A fish is represented in several collections of Chinese paintings as having upright ears like those of quadrupeds. It is probably to be explained by supposing, that the prolongations of the membranes of the opercula, peculiar to the *Pristipoma auritus*,

have been erected while drying, by one of those ingenious contrivances for which the Chinese are celebrated.

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FAMILY IV. SPAROIDES.

No scales upon the fins; six branchial rays.

TABLE LXII.

CLASS IV. PISCES.

Series 1. FISHES PROPER.

ORDER I. ACANTHOPTERYGII.

FAMILY IV. SPAROIDES.

Tribe 1. SPARUS PROPER. — *Round grinders on the sides of the jaw, like paving stones.*

GENUS I. SARGUS. *Charax.*

Cutting incisors in each jaw, like those of men; interoperculum hides the branchial rays; lower lip with a fold, in which is a fleshy tubercle.

Subgenus 1. PUNTAZZO. *Charanx.* — A single row of very small grinders.

2. CHRYSOPHRYS. *Daurades.* — At least three rows of round grinders in the upper jaw; some blunt, or conical teeth in front.

3. PAGEUS. — Two rows of small, round grinders in each jaw; front teeth soft, or like a carding comb.



**366 CLASS IV. ORDER I. ACANTHOPTERYGII.**

**Subgenus 4. PAGELLUS.** *Pagels.* — Grinders as above, only smaller; slender and numerous conical teeth in front; muzzle long.

**Tribe 2. —** *Conical teeth; some of those in front like hooks*

**GENUS I. DENTEX.** *Dentés.*

Preoperculum entire; cheeks scaly.

**Subgenus 1.** Two strong canines in front of each jaw; from two to four smaller teeth between; other teeth soft.

**2. LETHRINUS.** — Cheeks without scales.

**Tribe 3. —** *Teeth soft, or like carding combs, all round the jaws.*

**GENUS I. CANTHARUS.**

Outer row of teeth the strongest; muzzle short; jaws not protractile.

**Tribe 4. —** *Sharp teeth.*

**GENUS I. BOOPS.** *Bogues.*

Outer row of teeth cutting; mouth small and not protractile.

**GENUS II. OBLATA.** *Oblades.*

A row of soft teeth behind the cutting teeth.

**GENUS III. SCATHARUS.**

Muzzle short and obtuse; head short; a bony ridge on the operculum ending in a sharp point; one row of small, flattened, but pointed teeth.

**GENUS IV. CRENIDEUS.**

Two rows of cutting teeth in each jaw, wide and flattened, the ends of which are festooned and notched, and the three middle teeth the longest.

The Sargus is a fish which frequents the Mediterranean, and the western shores of Spain and Gascony, but is said never to go further north. It feeds upon Mollusca and sea weed, and to it ancient writers attributed a very singular attachment to goats. They said that no sooner did a goat appear on the shore than the Sargus swam to it with rapidity, and leaped about with joy. The fishermen accordingly were in the habit of covering themselves with the skin of a goat, on which the horns remained, and proceeding to the shore, where they scattered flour steeped in the juice of goat's flesh, upon which the fishes eagerly flocked to them, and suffered themselves to be taken by the hand. A pickled anchovy is now a successful bait for them.

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#### FAMILY V. MENIDES.

Upper jaw possessing the power of projecting and retreating.

The family of Menides or Mendoles (see TABLE LXIII.) was by former naturalists united to the Sparoides, to which it has considerable resemblance. It is, however, completely distinguished from it by its power of moving the upper jaw. It is named after one of the most common species in the Mediterranean, hitherto styled Sparus Moena, which, from its size, and the bad flavour of its flesh, is compared to contemptible people. The term Magna Mendole is one of great reproach in Venice.

TABLE LXIII.

CLASS IV. PISCES.

Series 1. FISHES PROPER.

ORDER I. ACANTHOPTERYGII.

FAMILY V. MENIDES.

GENUS I. MCENA. *Mendoles*.

Soft teeth within the mouth ; a narrow band of fine teeth on the jaws ; body oblong, and compressed like that of a herring ; a long scale above, and between each ventral.

GENUS II. SMARIS. *Picarels*.

No teeth within the mouth ; body less compressed.

GENUS III. CÆSIO.

Dorsal higher in front than elsewhere, its base surrounded by fine scales ; body spindle-shaped.

GENUS IV. GERRES. *Mocharra*.

Mouth protractile, and falling when projected ; fore part of the dorsal deep ; the hinder part having a scaly sheath at the base ; soft teeth on the jaws ; lips thick and fleshy.

ISOLATED GENUS. APHAREUS. *Caranzomore*.

Lower jaw longer than the upper, each having a narrow band of fine soft teeth ; operculum covered with scales ; seven branchial rays ; ventrals behind the pectorals ; three spiny rays in the anal ; small scales between the rays of the caudal fins.

The Picarel is so abundant in Ivica that it alone affords half the produce of the fisheries there. It has received its name from the piquant taste which it acquires after pickling.

The isolated genus *Aphareus*, isolated because it cannot be classed with any other family, will probably, when more is known of it, form the type of a new family, more approaching that of the *Menides* than any other. It was first observed in the Isle of France, where it bore the common name of *Sacrestin* or *Sacré-chien*. Its Malay name is *Foutac*. There is another species which frequents the Red Sea where it is called *Fare* by the Arabs.

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FAMILY VI. SQUAMMIPENNES.

A great part of the dorsal and anal fins covered with scales.

The scaly covering assumed by the fins of the *Squamipennes*, making them, as it were, one with the body, gives them a very marked appearance.

TABLE LXIV.

CLASS IV. PISCES.

Series 1. FISHES PROPER.

ORDER I. ACANTHOPTERYGII.

FAMILY VI. SQUAMMIPENNES.

GENUS I. CHÆTODON.

Teeth like the bristles of a brush; mouth small; dorsal and

anal fins so provided with scales that it is difficult to find their commencement ; mouth small ; six branchial rays.

Subgenus 1. CHÆTODONS PROPER.— Body more or less elliptic ; rays of the dorsal fin curved ; muzzle more or less projecting ; preoperculum sometimes finely dentated.

2. CHELMONS.—Long, slender muzzle, only opening at the end ; teeth softer than above.
3. HENIOCHUS. *Cochers*.—Spines on the back, the third or fourth prolonged into a filament, which is sometimes double the length of the body and resembles a whip.
4. ZANCLUS.—Characters as above, but scales so small as to appear like a slight roughness upon the body.
5. EPHIPPUS. *Cavaliers*.—Dorsal deeply notched between the soft and spiny part ; the former, without scales, folds into a furrow, formed by the scales of the back.
6. DREPANE.—Pectorals long, in the form of a scythe, and reaching the base of the caudal.
7. SCATOPHAGUS.—Four spines in the anal fin ; those of the dorsal numerous ; scales extremely small.
8. TAURICHTHYS. *Taurichtes*.—An arched and pointed horn over each eye ; protuberance on the top of the head.
9. HOLACANTHUS.—A sharp spike at the angle of the preoperculum, which is generally dentated.
10. POMACANTHUS.—Form more oval ; the edge of the dorsal fin rises rapidly.

## GENUS II. PLATAX.

A row of cutting teeth, each divided into three lobes, in front of the brush-like teeth ; body much compressed, and deep ; first dorsal spines hidden in its thick edge.

## GENUS III. PSETTUS.

Soft teeth ; ventral fins reduced to one spine only, without soft rays ; form of *Platax*.

## GENUS IV. PIMELEPTERUS.

The whole of the caudal and the soft part of the dorsal and anal covered with scales ; a single row of cutting teeth planted in the jaws by means of a heel, which is prolonged behind ; head obtuse.

## GENUS V. DIPTERODON.

Cutting teeth with oblique tops ; spiny part of the dorsal separated from the soft by a deep notch.

GENUS VI. BRAMA. *Castagnoles*.

A row of slender and pointed teeth in the upper jaw, and behind it a narrow band of soft or fine teeth ; two rows of similar teeth in the lower jaw, between which is a band of smaller teeth ; those of the internal row curve backwards ; from two to four in front, like canines ; teeth like a carding comb on the palate ; upright fins almost covered with scales.

## GENUS VII. SCORPIS.

Muzzle short and rounded ; lower jaw the longest when the mouth is open ; a wide band of soft teeth on each jaw, outside of which is a single row of strong, cylindrical, pointed teeth curving inwards, which decrease at the hinder part ; seven groupes of soft teeth within the mouth, and one at the base of the tongue ; operculum with two obtuse angles behind ; seven branchial rays ; head and branchial membrane scaly ; ten short and strong spines on the back, each having a membrane, which ends at the base of the next spine, and forming the spiny part of the dorsal, the soft part of which is scaly as well as the anal ; caudal shaped like a crescent.

## GENUS VIII. PEMPHERIS.

Long and scaly anal fin ; short and deep dorsal ; head obtuse

eye large ; a small spine on the operculum ; soft teeth on the jaws and within the mouth.

GENUS IX. TOXOTES. *Archers.*

Body short and compressed ; dorsal placed far back, with strong spines ; the soft part of it and the anal scaly ; lower jaw longer than the upper ; soft teeth on each jaw, within the mouth, and on the tongue ; six branchial rays ; suborbital and preoperculum finely dentated.

The great genus *Chætodon* is nearly confined to the seas of the torrid zone, and possesses the most extraordinary beauty of colour, rivalling, not only polished metals, but the most brilliant precious stones, arranged in such divers ways, in the form of stripes, bands, rings, spots, &c. that it is a hopeless task to attempt to describe them. Its name expresses the nature of its teeth, and is derived from two Greek words, meaning bristle and tooth.

Not so the *Toxotes*, which are better known to the inhabitants of the East, and especially the Chinese of Java, who keep them in their houses for the sake of witnessing the curious methods practised by these animals in eating insects or small animals which creep at a distance on aquatic plants, &c. They throw some drops of water to a great height, three feet or more, upon the desired object, and rarely missing it, thus cause it to drop into the water and become their prey.

**FAMILY VII. PHARYNGII LABYRINTHIFORMES.**

An apparatus within the mouth which enables them to retain water, and remain long on shore.

The curious structure of the pharyngeal bones of this family leads to the formation of a number of cells, which may be compared to the net-work in the paunch of the camel, and serve the same purpose, viz. that of containing a reservoir for water. This apparatus is enclosed by tightly-fitting, but convex opercula, so that when the fish is out of its native element the water does not easily evaporate, and all whose habits are known have the faculty of quitting their liquid habitations, and creeping on the dry land to a considerable distance.

**TABLE LXV.****CLASS IV. PISCES.****Series 1. FISHES PROPER.****ORDER I. ACANTHOPTERYGII.****FAMILY VII. PHARYNGII LABYRINTHIFORMES.****GENUS I. ANABAS.**

Teeth on the pharyngeal bones like pavement, and behind the skull; body round, and covered with strong scales; muzzle short and obtuse; mouth small; lateral line interrupted; preoperculum entire; five branchial rays; numerous spines in the dorsal and anal.



374 CLASS IV. ORDER I. ACANTHOPTERYGII.

GENUS II. HELOSTOMA.

A small, compressed, protractile mouth; very small teeth on the edges of the lips; five branchial rays; other characters as above.

GENUS III. POLYACANTHUS.

No teeth on the operculum; body compressed; four branchial rays; soft teeth on the jaws.

GENUS IV. COLISA.

Small teeth on the jaws; suborbital dentated; ventrals formed of one, long, single filament; five branchial rays.

GENUS V. MACROPODUS.

Dorsal, caudal, and ventrals end in a slender point; anal longer than the dorsal.

GENUS VI. OSPHROMENUS.

Anal as above; the first soft ray of the ventrals much prolonged; forehead a little concave; suborbital and bottom of the preoperculum dentated; six branchial rays; body much compressed.

GENUS VII. TRICHOPUS. *Trichopodes.*

Forehead more convex than above; scales all over the head; suborbital finely dentated; lateral line curved like an horizontal  $\omega$ ; first soft ray of ventrals very long.

GENUS VIII. SPIROBRANCHUS.

Form of Anabas; four branchial rays; opercula not dentated; operculum ending in two points; teeth on the jaws, and within the mouth, like a carding comb; three large pores in the lower jaw.

GENUS IX. OPHICEPHALUS.

No spines in the fins except one in each ventral; muzzle very short, wide, and obtuse; soft or carding teeth within the

mouth, and on the jaws, mixed with others like canines ; soft teeth behind the skull ; cheeks and opercula scaly ; rays of the dorsal branching and articulated ; plates on the head like those of serpents ; body long ; muzzle short and obtuse ; nostrils far apart, the foremost having a fleshy tube ; pre-opercula convex and covered with scales, as well as the cheeks ; dorsal fin all along the back.

The Anabas lives for hours, perhaps days, out of water, and in Tranquebar has been observed to climb trees, and live between the leaves, where there is generally a collection of water. A M. Daldorf took one from the bark of a palm tree \* at a height of five feet, and which grew near a pond.

The singular fishes of the genus *Ophicephalus* not only quit the waters in which they live, in order to crawl upon the shore, but traverse the land in search of other waters. They are so tenacious of life, that their entrails may be torn out, and they may be chopped in pieces before they are quite dead. The Indian jugglers make a show of this, and the natives of that country eat them. The Europeans, however, refuse them on account of their resemblance to a reptile.

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#### FAMILY VIII. SCOMBEROIDES.

Small scales ; body smooth ; caudal fin very strong.

The flesh, size, inexhaustible numbers, and yearly return to the same shores for the purpose of deposit-

\* The *Borassus flabelliformis*.

ing their spawn, make the Scomberoides one of the most useful of all genera to man.

TABLE LXVI.

CLASS IV. PISCES.

Series 1. FISHES PROPER.

ORDER I. ACANTHOPTERYGII.

FAMILY VIII. SCOMBEROIDES.

Tribe 1.—*Spurious fins.*

GENUS I. SCOMBER

First dorsal separated from the second by a considerable space; two small crests on the sides of the tail.

Subgenus 1. SCOMBER PROPER. *Mackarel, Maquereaux.* —

Body spindle-shaped, covered with small, smooth scales; five spurious fins, consisting of five isolated spines, the last of which is forked and has a membrane; the same between the anal and the caudal, preceded by a small free spine immediately before the anal fin.

2. THYNNUS. *Tunny, Thons.* — Large scales under the throat, forming a corslet; a cartilaginous scale on the sides of the tail besides the crests; first dorsal nearly reaches the second; spurious fins numerous; no free spine before the anal.

3. ORCYNUS. *Germons.* — Very long pectorals; other characters as above.

4. AUXIS. — Pectorals moderate; dorsals far apart; teeth small; spurious fins, and corslet of Thynnus.

Subgenus 5. **PELAMYS.** *Pelamides.* — Corslet small ; teeth stronger than above, eight or nine spurious fins above, seven below.

6. **CYMBIUM.** *Tassards.* — Body long ; no corslet ; teeth large, compressed, cutting, and in shape like lancets ; soft teeth on the palate.

7. **THYRSITES.** — Body long ; no corslet ; front teeth much longer and stronger than the others ; small pointed teeth on the palate ; no crests, or keel on the tail.

8. **GEMPYLUS.** — No teeth on the palate ; ventrals almost invisible ; body long.

#### ISOLATED GENUS I. LEPIDOPUS.

No spurious fins ; no soft rays in the dorsal fin ; in all other respects the same as Gempylus.

#### ISOLATED GENUS II. TRICHIURUS.

No ventrals ; anal consisting of small spines just piercing the skin ; tail ends in a point and has no caudal ; other characters as above.

Tribe 2. — *Muzzle like a dart or sword.*

#### GENUS I. XIPHIAS. *Sword Fish, Espadons.*

Body long ; round behind ; the muzzle like the blade of a sword ; edges sharp, dentated, and ending in a sharp point ; under jaw ending suddenly in a point ; soft teeth on the pharyngeal bones ; pectorals placed low on the body ; membrane of the hind part of the dorsal fin so slight that it breaks ; a rough skin on the body ; a projecting membranous crest on each side of the tail.

Subgenus 1. **XIPHIAS PROPER.** — No ventral fins.

2. **TETRAPTERUS.** — Muzzle in the form of a stiletto ; ventrals reduced to a single ray, ending in a

filament ; two projecting crests on the sides of the tail.

Subgenus 3. **MAKAIRA.** — Crests on the tail ; no ventrals ; muzzle as above.

4. **HISTIOPHORUS.** *Voiliers.* — Muzzle and crests as above ; dorsal very deep, and serving as a sail ; ventrals long, and composed of two rays.

Tribe 3. **CENTRONOTUS.** — *The spiny rays of the back or first dorsal separated.*

**GENUS I. NAUCRATES.** *Pilot Fishes, Pilotes.*

Body spindle-shaped ; tail keeled like the Tunny ; two free spines before the anal ; spines of the first dorsal very small.

Subgenus 1. **ELACATE.** — No keel on the tail, or spines before the anal.

2. **LICHIA.** — One spine lying down with its point forwards, before the free spines of the back ; two free spines before the anal.

3. **CHORINEMUS.** — Characters as above, but the membrane of the dorsal and anal fins so slight, that it disappears and gives them the appearance of spurious fins.

4. **TRACHINOTUS.** — Dorsal and anal prolonged into a point.

**GENUS II. RHYNCHOBDELLA.**

Free spines like Naucrates ; no ventrals.

Subgenus 1. **MASTACEMBELUS.** — Muzzle fleshy, moderately long, and like a cone ; three or four spines on the operculum ; dorsal and anal almost united to the caudal.

**GENUS III. NOTACANTHUS.** *Campilodon.*

Ventral fins ; other characters of the tribe.

Tribe 4. — *Lateral line provided with keeled and scaly shields.*

GENUS I. CARANX.

Two distinct dorsals ; a spine lying down before the first ; two free spines before the anal ; last rays of dorsal and anal with a slight membrane, so that they are often separated into spurious fins.

Subgenus 1. TRACHURUS. *Saurels.*—Plates on the lateral line deeper than long.

2. CARANX PROPER.—Pectorals like a scythe ; nine spurious fins above, eight below ; first part of the lateral line unarmed.

3. CARANGUES.—A crest on the head ; profile arched ; other characters as above.

GENUS II. OLISTUS.

Middle rays of the second dorsal articulated, and taking the form of long filaments.

GENUS III. SCYRIS.

Profile raised and sharp ; first dorsal entirely hidden ; a portion of the rays of the second prolonged into filaments.

GENUS IV. BLEPHARIS.

Very small spines in the first dorsal ; the first rays of the second and the anal prolonged into fine threads ; ventrals much prolonged.

GENUS V. GALLICHTYS. *Gals.*

Body deep and compressed ; profile much raised ; ventrals long ; caudal forked ; first dorsal very shallow, or reduced to short spines ; first rays of the second and anal excessively prolonged.

GENUS VI. ARGYREIOSUS.

Line of the profile straighter and longer than above ; fore part of

the back straight ; body deep ; scales invisible ; keels on the scales of the lateral line scarcely visible.

GENUS VII. VOMER.

Profile almost upright, and a little concave ; head higher than the line of the back ; soft teeth ; ventrals very short ; first dorsal very shallow and slight, only the third and fourth rays having a visible membrane ; lateral line a little undulating ; keels on the caudal plates but little visible.

GENUS VIII. HYNNIS.

No vestige of a first dorsal ; plates on the lateral line stronger and sharper than above.

Tribe 5.—*No spurious fins, or free spines on the back ; tail unarmed.*

GENUS I. SERIOLA.

Soft, or fine, carding teeth on the jaws, and within the mouth ; second dorsal double, the depth of the first lessening towards the end ; anal of the same form ; in other respects like the *Caranx*.

GENUS II. TEMNODON.

Straight, compressed teeth in the form of pointed lancets ; behind the middle of the upper row are others, which are smaller ; soft teeth within the mouth, and at the base of the tongue ; preoperculum ciliated ; rays of the first dorsal very thin and flexible ; simple tubes along the lateral line ; in other respects like the *Seriola*.

GENUS III. LACTARIA.

Soft teeth in each jaw and on the palate ; two or four arched, pointed, and long hook'd teeth in the upper jaw, and a row of small, fine, sharp, crook'd teeth below ; other fine and small teeth within the mouth ; edges of the tongue rough.

GENUS IV. NOMEUS. *Pasteurs*.

Mouth small; a single row of teeth on the jaw, which are crook'd and wide apart; no free spines before the anal; very large ventrals, which fold into a groove of the belly when closed; opercula entire.

## GENUS V. NAUCLERUS.

Teeth like those of *Seriola*; a spine, often accompanied by two, which are smaller, on the blunt angle of the preoperculum.

## GENUS VI. PORTHMEUS.

Body compressed; one dorsal; preoperculum dentated; dentated crests over the eyes; teeth as above.

## GENUS VII. PSENES.

No teeth in the palate; those of the jaws short, crook'd, separate, and in a single row; muzzle obtuse; upright fins partly covered with scales.

GENUS VIII. CORYPHÆNA. *Dorades, Dolphin, Dofin*.

Body oblong, compressed; scales small; upper part of head sharp and much raised; the dorsal all along the back composed of flexible spines.

- Subgenus 1. CORYPHÆNA PROPER. — Head much raised; profile convex; eyes very low in the head; teeth like a carding comb; dorsal high in front and commencing on the skull.
2. LAMPUGUS. — Crest on the head much lower; dorsal equal and shallow.
3. CENTROLOPHUS. — Head but little raised; no teeth on the palate; three small pointed projections before the dorsal fin.

## GENUS IX. ASTRODERMUS.

Head much raised and sharp; mouth small; four branchial



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rays; ventrals very small; scales radiated like stars; lower jaw a little the longest; jaw teeth like hairs; soft teeth on the palate and at the bottom of the tongue.

GENUS X. PTERACLIS. *Oligopode*.

Scales large; frontal crest not high; dorsal and anal deep, the former beginning on the neck; ventrals under the throat; body oblong and compressed; carding teeth on the palate and jaws; asperities on the tongue.

GENUS XI. STROMATEUS.

Body covered with small scales, more or less hidden in the skin, short and compressed; head compressed; no ventrals; one dorsal, the foremost rays of which are hidden in the edge; upright fins covered with scales.

Subgenus 1. RHOMBUS. — A vestige only of ventrals.

2. LUVARUS. *Louvareou*. — A concave inflexion above the muzzle; no jaw teeth; an adipous keel on the tail behind the dorsal and anal; caudal forked.

GENUS XII. SESERINUS.

Ventrals very small; other characters like those of Stromateus.

GENUS XIII. KURTUS.

Body much compressed; belly sharp; a notch at the angle of the preoperculum, and three small spines on the lower edge; soft teeth on the jaws, and within the mouth.

Tribe 6. — *Mouth protractile*.

GENUS I. ZEUS.

Two dorsals, the first formed of spiny rays, accompanied by long, filiform shreds, longer than the spines or membrane; a series of pointed forks on the sides, placed on bony plates, inserted at the base of the second dorsal and anal; fine carding

teeth on each jaw, and within the mouth; two anals; two rows of bony plates under the belly, each having a ridge ending in a little hook.

Subgenus 1. **CAPROS.** — No spines at the base of the fins; teeth very small; mouth more protractile than above; hard, rough scales on the body.

**GENUS II. LAMPRIS.** *Chrysostomus*.

One dorsal fin; seven branchial rays; one spine in the dorsal; pectorals placed in a horizontal line, and like scythes; body deep and compressed; scales small, and fall easily.

Subgenus 1. **EQUULA.** — Scales small and smooth; teeth fine; one or two spines on the foremost angle of the orbit; front of head flat or concave; nape of neck high, forming a bony crest before the dorsal, and a similar crest before the anal; a pointed scale at the base of the ventral; scales scarcely visible.

2. **MENE.** — Line of the back almost straight; that of the belly very convex and sharp; mouth very protractile; soft teeth on the jaws; anal fin festooned.

The well-known Mackarel scarcely needs any comment, and frequents all the European coasts. They are supposed to winter in the north, where they remain benumbed under ice and snow, with their noses in the mud, and when awakened from their lethargy are quite blind, probably from the thickening of the skin over the eye. This goes off in a few days, and they then proceed with their migrations, which have never been known to extend further south than the Canary Islands. Mr. Yarrell, in his excellent work on British Fishes, says that there is no month in the year in which they are not caught in some part of the

English coasts. The famous sauce, or Garum of the Roman epicures was made from the Scomberoides, but more especially the Mackarel. It is said to have been invented in Greece, and there are two or three receipts for it. In all, the intestines were salted and exposed till they became putrid, and then the liquor proceeding from them drawn off; but some added pieces of the flesh, old wine, and marjoram. The best was that made from the blood and intestines of the Tunny, which were put with strong brine into a vase, and allowed to stand covered for two months. The bottom of the vase was then pierced with holes, and the liquor which ran from it was the garum. Its taste appears to have been of an acrid nature, and it was supposed to provoke appetite. The most esteemed was made in Carthagera, was very costly, and Apicius proposed that mullets should be drowned in it, in order to eat them in perfection. It is a curious fact that with the Mackarel, as well as many other fishes, some species have swimming bladders and others not, and yet there is no apparent difference of habits or condition. The numbers of mackarel taken at one haul of the net often amount to thousands.

The Tunny is a much larger fish than the Mackarel, and some on record are said to have weighed one thousand pounds. Their flesh looks anything but tempting, and the author has seen it frequently in Portugal and Madeira cut into large square pieces, and in colour resembling lumps of coarse beef. The Tunny fishery presents the most animated scene, and

is one of the most ancient, especially at both ends of the Mediterranean and in the Black Sea. The fishes are driven by means of nets into a small space, where men in boats with long poles knock them on the head. They spawn in the Mediterranean, are rare in England and Scotland, and are timid and easily frightened by noise. The flesh of the belly is considered the best eating, but the whole of the body is salted as well as the eggs, and both form an article of exportation. The Bonita is a species of Tunny, and frequents the deep seas of the Tropics.

The Lepidopus is of great size, and beautiful in colour, reported by many travellers, and yet remaining unknown to naturalists till the end of the eighteenth century. It looks like a large silver ribbon undulating in the water, and assuming the tints which peculiarly belong to metallic lustre. Its flesh is said to be firm and delicate, but it is much tormented by internal worms.

The Sword Fish has been known in all times, and often accompanies the Tunny; the young are eaten, but their muzzle is cut off before they are brought to market. These formidable fishes go from the Mediterranean to the north, and one was caught off the coast of Carmarthenshire, the sword of which was three feet long. They are said to go in pairs, male and female; and the manner of fishing for them is a miniature representation of that for whales. Brydone, in his Sicilian tour, says that the fishermen of that island sing a Greek song, which they say is sure to attract them, but that if they hear a word

of Italian, the fishes plunge into the deep and are no more seen.

The great height of the dorsal fin of the *Histiophorus* or Voilier has given it the name of the Sailor in several languages. It inhabits various seas, and is said to lower and raise its fin when swimming. It is like a small whale in size, and its beak is often four feet long. Several instances have occurred of its driving this beak into a vessel and breaking it off, when it stops the leak which it would otherwise have made. Various museums contain proofs of this, and mariners say that they have felt the shock of the fish striking the vessel, without being conscious at the time whence it proceeded.

The Pilot-fish is said to guide the shark, and is supposed to be the *Pompilus* of the ancients, which pointed out the safe track to anxious navigators, and only quitted them when it had brought them in safety to the shore; it was consequently held sacred. It certainly follows vessels, and sharks do not eat it, because, most probably, it is skilful enough to avoid them; and hence the supposition that it acts as their pilot.

That excellent fish the John Dory belongs to the genus *Zeus*, and in the Mediterranean bears the name of several saints; that of St. Peter, because it is supposed to have been the fish which supplied the tribute money, and the black spot on each side is said to be the eternal mark of the apostle's finger and thumb. The modern Greeks call it St. Christopher's Fish, and hang it up in their churches. Its unprepossessing

appearance long prevented it from being eaten, and the knowledge of its excellence is attributed in England to the actor Quin.

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## FAMILY IX. TEUTHYES.

A single row of sharp teeth in each jaw.

The family of Teuthyes (see TABLE LXVII.) is entirely composed of fishes foreign to Europe, and consequently but little is known of their habits.

## TABLE LXVII.

## CLASS IV. PISCES.

## Series 1. FISHES PROPER.

## ORDER I. ACANTHOPTERYGII.

FAMILY IX. TEUTHYES. *Teutyes*.

GENUS I. AMPHACANTHUS. *Sidjans, Siganus, Buro, Centrogaster*.

Teeth small, cutting, and notched; mouth small; two ridges between the eyes; a strong spine at each side of the ventrals; head and body covered with small, smooth, oval scales; five branchial rays.

GENUS II. ACANTHURUS. *Harpurus, Doctors, Chirurgiens*.

Teeth cutting and notched; a strong, moveable, sharp spine, like a lancet, on each side of the tail, which lies in a furrow when at rest.

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GENUS III. NASEUS. *Nasos, Monoceros.*

Teeth conical and pointed; fixed and sharp plates on the tail, and not spines; other characters as above; a horn or projection on the forehead or muzzle; body rough; three soft rays in the ventral.

GENUS IV. PRIONURUS.

Tail as above; teeth notched; and a spine lying in front of dorsal.

GENUS V. AXINURUS.

Body longer and less compressed than above; teeth and mouth excessively small; one sharp plate on each side of the tail in the shape of a hatchet; body rough; ventrals of Naseus.

GENUS VI. PRIODON.

Teeth like a saw; ventrals of Naseus; tail unarmed.

GENUS VII. KERIS.

Teeth fine, pointed, close to each other; tail unarmed; ventrals placed before the pectorals, each having five rays; mouth very small; a projection under the throat like a goître.

A small species of *Amphacanthus* in the Marianne Isles, and there named *Magnahac*, appears periodically for a few days in prodigious quantities, during which time they are caught, dried in the sun, and afterwards preserved in vinegar with aromatic herbs. Thus pickled they form a large portion of the food of the inhabitants.

The horn of the *Naseus* is often reduced to a mere tubercle, and the fish is often called the Little Sea Unicorn.

## FAMILY X. TÆNIOIDES.

Body very much elongated and flattened ; scales very small.

The first tribe of the Tænioides (see TABLE LXVIII.) more particularly deserves the name of Ribbon Fishes than the other division of the family, for there are some species in it measuring from nine to ten feet, whose body is not more than six or seven inches deep, and scarcely an inch thick. It has long been difficult to define the characters of the two first genera clearly, as they are foreign fishes, and have never been brought before naturalists in a perfect condition.

## TABLE LXVIII.

## CLASS IV. PISCES.

## Series 1. FISHES PROPER.

## ORDER I. ACANTHOPTERYGII.

## FAMILY X. TÆNIOIDES.

Tribe 1. — *Mouth but little cleft ; body very long.*

## GENUS I. TRACHYPTERUS.

Body like thick paper ; a fin on the back of the neck, with seven slender rays ; the usual dorsal commences immediately behind, is connected by a membrane, deeply notched, with the first fin, and extends the whole length of the body ; caudal on the upper edge of the tail ; at the end is a fin, which appears like



**390 CLASS IV. ORDER I. ACANTHOPTERYGII.**

a second lobe to the caudal; pectorals short; ventrals attached under pectorals.

**GENUS II. GYMNETRUS.**

Ventrals formed of one long ray, dilated at the end; mouth very protractile; very fine and short teeth on each jaw; a fin on the top of the head, followed by seven rays, each of which has a dilated membrane at the end; the dorsal fin joins to these rays, and goes all along the back.

**GENUS III. STYLEPHORUS.**

Tail prolonged beyond the caudal fin, in the form of a thin cord, and longer than the body.

**Tribe 2. — *Mouth much cleft; body shorter.***

**GENUS I. CEPOLA.**

Body like the blade of a sword; very long dorsal and anal; ventrals placed under the pectorals; muzzle obtuse; sharp teeth on the jaws; scales small and smooth; six branchial rays.

**GENUS II. LOPHOTUS.**

A horn several inches long on the top of the head, having a nearly triangular crest at the base; the eye enormous; carding teeth on the jaws, and within the mouth; six branchial rays; ventrals very small.

**ISOLATED GENUS. ATHERINA.**

Upper jaw very protractile; very small teeth on the jaws and different parts of the mouth; small teeth on the pharyngeal bones; six branchial rays; two dorsals; ventrals under the belly.

The *Atherina* is another of those isolated genera which are waiting to find their places among the *Acanthopterygii*. It is a small fish of delicate eating, lives in troops, and the young for some time after birth hang together in close masses, when the mass is boiled in milk, and eaten on the shores of the Mediterranean, where they are supposed to be of spontaneous generation. In Venice they are sold as cat's meat. One species, found on the coasts of France and England, has been often called the Smelt; another frequents the American and Australian seas, and Baron Humboldt speaks of it in Peru as abundant and delicious. A third species is supposed to exist in the elevated Lake of Titicaca, in Upper Peru.

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#### FAMILY XI MUGILOIDES.

Body almost cylindrical; large scales; two dorsals far apart.

The small mouth and complicated pharyngeal bones of the Mugils, or Mulletts, do not admit any other food to pass down their throats than that which is either very small, or in a liquid state. They are of a very pacific nature, and are constantly pursued by stronger, or more voracious fishes.

TABLE LXIX.

CLASS IV. PISCES.

Series 1. FISHES PROPER.

ORDER I. ACANTHOPTERYGII.

FAMILY XI. MUGILOIDES.

GENUS I. MUGIL. *Mullet, Mullet.*

Ventrals under the belly ; two dorsals, far apart ; mouth small ; lower lip has a protuberance, which fits into a notch of the upper jaw ; teeth extremely small and fine, often nearly imperceptible ; suborbital finely dentated ; opercula wide and swelled.

GENUS II. CESTRÆUS.

Body compressed ; teeth on the upper jaw only ; two dorsals, the first having only four spines, the last of which is much prolonged ; mouth protractile.

GENUS III. DAJAUS. *Dajao.*

Soft teeth within the mouth, and on the jaws ; mouth compressed.

GENUS IV. NESTIS.

Head much compressed ; opercula flatter than those of Mugil ; teeth on the jaws, in the mouth, and on the pharyngeal bones ; upper lip very thick, lower very large, folded back, callous, and sharp.

GENUS V. TETRAGONURUS.

Body spindle-shaped ; upper jaw the longest ; some pores on the hinder part of the orbit ; bony projections on the muzzle, side of the head, under the eyes, and lower jaw ; suborbital

large ; upper lip like a fleshy pad, and simple conical teeth on the upper jaw ; lower jaw deep in the middle, so that the upper edge is arched ; a single row of teeth on the latter, others within the mouth, all long and pointed ; carding teeth on the pharyngeal bones ; opercula hidden under the scales, which, with those of the body, are hard, and are so arranged as to make longitudinal ridges.

The Mulletts come in crowds to the mouths of rivers in order to deposit their spawn, and fisheries were established for them in the time of Pliny, and have been continued to the present time. It will be readily supposed that the help of dolphins is now no longer required, but the above writer asserts that the latter fishes were in the habit of making a circle round the Mulletts to prevent them from escaping, and that they patiently waited for their share when the Mulletts were caught. He probably turned an accidental circumstance into a confirmed habit. A species which inhabits the Nile was said by Strabo to be protected from crocodiles by the Silures, and therefore they were constantly to be seen together ; that they entered the river a little after the setting of the Pleiades to deposit their eggs, and then returned. The flesh of the *Tetragonurus* is white and tender, but unwholesome ; and M. Risso, the ichthyologist of the Mediterranean, experienced all the symptoms of poison after eating it. He attributes it to the nature of its food, which is chiefly on acrid Mollusca.

## FAMILY XII. GOBIOIDES.

Dorsal spines slender and flexible.

The Gobioïdes (TABLE LXX.) are generally small in size, and frequent rocky coasts, where they live under stones at low tide, but are not easily taken on account of their vivacity. Some of the species are viviparous. The name of Blennius is derived from a Greek word meaning mucosity, which well expresses the slimy nature of these fishes. Their flesh is white, tender, and of good flavour; they abound in the Mediterranean, on the coasts of England, each side of the Atlantic, and have been found at the Sandwich Islands.

## TABLE LXX.

## CLASS IV. PISCES.

Series 1. FISHES PROPER.

## ORDER I. ACANTHOPTERYGII.

## FAMILY XII. GOBIOIDES.

GENUS I. BLENNIUS. *Blenny, Baveuses.*

Body long; no scales; six branchial rays; ventrals placed under the throat, and apparently formed of two rays; one dorsal all along the back; tentacula of various forms about the eyes, nostrils, or back of the neck; mouth small; teeth strong, one row in each jaw, often ended by a long canine.

Subgenus 1. PHOLIS.—No tentacula on the orbits.

- Subgenus 2. **BLENNECHIS.** — The external opening of the branchiæ like a small crack at the base of the pectoral; lower incisors have a large canine on each side, which, in some species, becomes enormous and curves backwards; in others, enters into a hole in the palate, when the mouth is closed.
3. **CHASMODES.** — Branchial opening above the pectorals; mouth much cleft; teeth only in the front of the jaws.
  4. **SALARIAS.** — Numerous, sharp teeth, only inserted into the skin which covers the jaw bones, and so moveable that each may be raised or lowered independent of all the others. They appear to shake with every motion of the lips.
  5. **CLINUS.** — Body compressed; long and covered with scales; a row of strong, conical and pointed teeth, and soft teeth behind; teeth within the mouth; numerous rays in the dorsal fin.
  6. **MYXODES.** — Muzzle elongated; body flat and compressed; a single row of teeth in each jaw, the largest in front; no canines, and none on the palate; numerous dorsal rays, the three foremost of which are detached from those which follow.
  7. **CRISTICEPS.** — The three detached spines of the dorsal placed so as to look like a crest upon the head; a tentaculum above each eye, one which is forked on each side of the muzzle.
  8. **CIRRHIBARBIS.** — Numerous tentacula upon the head and chin; teeth soft; a great number of spiny rays in the dorsal fin.
  9. **TRIPTYGION.** — Dorsal divided into three parts.
  10. **GUNNELLUS.** — Body long; much compressed; head oblong; mouth much cleft; carding, or soft teeth. The whole of the dorsal fin com-

posed of spiny rays ; ventrals very small, and often reduced to one spine.

Subgenus 11. **ZOARCES.** — Seldom any spiny rays in the fore part of the dorsal or anal ; if any exist, they are at the hinder part of the fin ; scales in the form of little points ; a single row of conical teeth on the sides of the jaws, two or three in front ; six branchial rays ; dorsal and anal united to the caudal.

12. **ANARRHICAS.** — No ventrals ; dorsal all along the body ; large, bony tubercles inside the mouth, bearing little enamelled teeth ; teeth in front of the mouth conical ; pharyngeal teeth conical and pointed ; no lateral line ; all the fins have a thick skin.

## GENUS II. OPISTOGNATHUS.

Rays of the fins simple and flexible, except the sharp, bony spines of the ventrals, which are placed under the throat, before the pectorals, and which have five soft rays ; carding teeth ; dorsal extends from the head to a little before the caudal ; lateral line much marked ; other characters like *Blennius*.

## GENUS III. GOBIUS. *Goby, Gobie.*

Ventrals exactly under the base of the pectorals, united by a membrane which passes from one to the other spine, and with the fins forms a sort of funnel under the body ; head wide, slightly convex ; muzzle obtuse ; a wide band of soft teeth on each jaw, and a row outside of crook'd teeth ; the six or seven first rays of the pectorals free for more than two-thirds of their length, and branch into threads or bristles ; five branchial rays.

Subgenus 1. **APOCRYPTES.** — Two dorsals ; caudal pointed like a lancet ; teeth pointed and separated, placed in a single row on each jaw ; scales very small.

Subgenus 2. **TRYPAUCHEN.** — One dorsal ; anal joins the caudal ; a deep depression above the operculum.

3. **AMBLYOPUS.** *Tenioide.* — Three upright fins united ; crook'd teeth ; eyes so small that they can scarcely be distinguished.

#### GENUS IV. SICYDIUM.

Ventrals united so as to form a round basin ; a row of equal, flexible teeth in each jaw ; some strong teeth within the lower jaw ; tail round.

#### GENUS V. PERIOPHTHALMUS.

Eyes projecting and close together, with membranous eyelids ; pectorals partly enveloped in muscles and skin, the latter of which is often scaly ; ventrals like those of the Gobies ; teeth upright in one row ; the lower eyelid stands up in a singular fashion ; some have the ventral disk separated in the middle, near the base, and others have it entire.

Subgenus 1. **BOLEOPHTHALMUS.** — Teeth of upper jaw straight and strong ; those of the lower very fine and horizontal, except two within, which remain standing up, strong, and pointed.

#### GENUS VI. ELEOTRIS.

Ventrals separate ; six branchial rays ; soft teeth.

#### GENUS VII. PHILYPNUS.

Teeth like a carding comb within the mouth, and larger teeth on the jaws.

#### GENUS VIII. CALLIONYMUS. *Dragonnet.*

Branchial openings like a hole on each side of the neck ; ventral fins under the throat, wide apart, and wider than the pectorals ; head oblong and flattened ; mouth very protractile ; lower angle of operculum prolonged, and ending in diverging points ; soft teeth on the jaws ; skin smooth.



GENUS IX. HEMEROCÆTES.

Body long, nearly cylindrical; end of the muzzle flattened, obtuse, and slightly notched; upper jaw the longest; upper lip double; a hole for the branchial opening; seven branchial rays; one dorsal; body covered with scales.

GENUS X. TRICHONOTUS.

Wide branchial openings; body as above; muzzle sharp; eyes almost touch each other; soft teeth on the jaws and in the mouth; seven branchial rays; pectorals, ventrals, and caudal pointed; body covered with finely striated scales.

GENUS XI. PLATYPTERA.

Two dorsals, far apart; head horizontally triangular; soft teeth on the jaws; no teeth on the palate; mouth under the edge of the muzzle; large ventrals behind the pectorals; six branchial rays.

GENUS XII. COMEPHORUS.

No ventrals; body large in front; head flattened; eyes placed high; mouth wide; teeth soft; lower jaw longer than the upper; pores about the jaws; gills wide; six branchial rays; pectorals on a stem, with flexible hair-like rays; first dorsal with five rays; no scales.

The *Pholis lævis* climbs rocks; and Pennant says that it bites severely, and frequents those places where sea-weed is abundant on the Welsh coasts; and although it will live thirty hours out of its element, dies directly it is put into fresh water. Mr. Couch asserts that it can turn one eye one way while the other assumes an opposite direction.

The *Salarias alticus*, according to Commerson and Forster, runs along the rocks with great rapidity by

means of its pectoral and ventral fins, so that it might be taken for a lizard. It pursues insects, and is with difficulty secured from the leaps which it takes when approached.

The Zoarces, also viviparous, are common in the north of Europe and England, but rare in the south. Their young swim very rapidly directly they are born, and are so transparent that their blood may be seen to circulate when looked at through a microscope.

The strong jaws, and severe bite of the *Anarrhicas Lupus* have procured it the name of Wolf-fish ; it is common in the northern seas, and has been known to break the blade of a knife between its jaws ; its flesh is good when boiled, and its skin makes glue or shagreen.

According to Aristotle, the Gobies are the only fishes which make a nest and lay their eggs in it, which are watched by the male. The latter habit is common to several. The same may be said of the fry of the Spotted Goby as of that of the *Atherina*, and it goes under the same name in Provence, &c. i. e. Nonnet (*non*, not, *né*, born). It was a dish much liked by the Athenians, and when not to be had, imitated by them in various ways. Aristotle adopted the notion that it was generated by the foam of the sea or rain, or by mud, although he recognised some as the young of fishes.

The *Comephorus* is a rare and singular fish, coming from the depths of Lake Baikal, where it is only thrown ashore when the water is agitated by storms

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in summer. They are so fat that they seem to be one lump of grease, and their bones are extremely soft. Pallas says that they were only known in 1770, were never taken alive, and were only used for their oil, even the crows refusing to eat them.

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FAMILY XIII. PECTORALES PEDICULATÆ.

Pectoral fins placed upon a kind of stem.

The fishes of this family (see TABLE LXXI.) rarely have any scales; their pectorals are borne upon a stem; their branchial openings are a round hole, or slit, behind the pectorals, and they have no suborbital bone.

TABLE LXXI.

CLASS IV. PISCES.

Series I. FISHES PROPER.

ORDER I. ACANTHOPTERYGII.

FAMILY XIII. PECTORALES PEDICULATÆ.

GENUS I. LOPHIUS. *Baudroies*.

Head extremely large, wide, flattened, and spiny; mouth much cleft, armed with conical, slender teeth on the jaws, within the mouth, and on the pharyngeal bones; six branchial rays; preoperculum visible, the other opercula hidden in the muscles; no suborbital; two dorsals, the three first rays of the

foremost detached, and prolonged into long filaments, ended by fleshy shreds : large branchial membrane.

GENUS II. CHIRONECTES. *Antennarius*.

Head vertically compressed ; no other spiny fin behind the three free spines ; most of them have the power of swelling themselves into a balloon ; branchial orifice like a small, round hole, hidden in the angle of the pectoral ; carding teeth on the jaws, and within the mouth ; opercula hidden under the skin ; six branchial rays ; the rays of the pectorals and ventrals pass beyond the membrane ; no suborbital.

GENUS III. MALTHEA.

The fore part of the body flattened and enlarged ; branchial orifice as above ; no first dorsal ; body covered with a hard, tuberculous skin, provided all round with fleshy filaments ; muzzle projects, the small mouth opens under it, but is protractile ; a stem attached to their muzzle, ends in a small bundle of fleshy threads ; soft teeth on the jaws, and within the mouth.

GENUS IV. HALIEUTÆA.

Body rounded ; muzzle not prolonged ; no teeth within the mouth, but soft teeth on the jaws ; no suborbital.

GENUS V. BATRACHUS. *Fishing Frog, Angler, Batrachoides*.

Head large and flat ; wide mouth, provided all round with shreds of skin ; a very small first dorsal ; arms of the pectorals short and flat ; ventrals placed under the throat, with three rays, the first of which is like a sword ; teeth on the jaws, and within the mouth ; six branchial rays ; second dorsal and anal long and shallow ; suboperculum as large as the operculum, and like it, ended by strong spines ; no suborbital.

The branchial membrane of the *Lophius* is so large, that it embraces the neck and base of the pectorals. It swims with difficulty, and generally keeps in the sand and mud, with its long filaments floating freely above, to attract other fishes, which it seizes the moment they come within reach.

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FAMILY XIV. LABROÏDES.

Body oblong and scaly ; jaws covered with thick, fleshy lips.

The term Labroides, applied to a family of fishes remarkable for thick, fleshy, folded, and prominent lips, is taken from the word Labrus, an ancient name for a fish, the characters of which are not exactly ascertained.

TABLE LXXII.

CLASS IV. PISCES

Series I. FISHES PROPER.

ORDER I. ACANTHOPTERYGII.

FAMILY XIV. LABROIDES.

Tribe 1. — *Teeth separate.*

GENUS I. LABRUS. *Wrasse.*

Form oval ; lips thick and fleshy, apparently double on the upper jaw ; opercula scaly and entire ; teeth strong, conical,

longer near the chin; spiny rays of dorsal more numerous than the soft rays; anal spines short and thick; a fleshy shred often attached to the point of each.

GENUS II. COSSYPHUS.

Behind the outer row of pointed teeth are some small, grained, round, close teeth; opercula scaly; upright fins provided with scales; almost all have a zigzag edge to the preoperculum.

GENUS III. CRENILABRUS.

Preoperculum dentated with a zigzag edge; thick and fleshy lips; a single row of conical teeth in each jaw; spiny dorsal without scales; lateral line not interrupted.

GENUS IV. CTENOLABRUS.

A band of soft teeth behind the conical teeth of the jaws; preoperculum edged like a comb; three spiny rays in the anal.

GENUS V. ACANTHOLABRUS.

Preoperculum dentated; external row of teeth thick and conical; behind these a narrow band of smaller teeth; numerous spiny rays in the anal.

GENUS VI. SUBLETS. *Coricus*.

Mouth very protractile; lateral line not interrupted; other characters like Labrus.

GENUS VII. CLEPTICUS.

Muzzle protractile; preoperculum dentated, lateral line not interrupted; a single row of scarcely perceptible teeth on the jaws; pharyngeal teeth like little plates, with edges like a saw; a great part of the upright fins covered with scales.

GENUS VIII. LACHNOLAIMUS.

Lips, form, scales, and fleshy shreds of Labrus; first dorsal spines prolonged and flexible, lateral line not interrupted;

front teeth strong, crook'd, followed by a series of small, equal teeth; pharyngeal bones partially covered with teeth, like pavement, and the rest with a surface like velvet.

GENUS IX. TAUTOGA.

A double row of teeth on each jaw; skin thick and without scales, covering the opercula.

GENUS X. MALACANTHUS.

Flexible spines in the long dorsal and anal; cheeks covered with scales; small scales on the body, which is long; one row of teeth in each jaw, some of which are strong and crook'd; carding pharyngeal teeth above these, and pavement like teeth below; a strong spine at the angle of the operculum.

GENUS XI. CHEILIO.

No prolongations of the spines of the dorsal, which are soft; external row of teeth triangular, compressed, and cutting; the two in the middle crook'd, the spaces between all these teeth filled by others, which are small and conical; lateral line not interrupted; a few scales on the operculum.

GENUS XII. JULIS. *Girelles*.

Lateral line not interrupted; stiff and prickly spines in the dorsal; the whole head without scales; teeth conical, stronger in front, and behind these a variable number of tuberculous, grained teeth; pharyngeals like Labrus.

GENUS XIII. ANAMPSES.

Two teeth in each jaw, those above far apart, flattened, sloped, and cutting; those below are more conical, though a little flattened at the extremity; six branchial rays.

GENUS XIV. GOMPHOSUS.

Body oblong, compressed; scales large; head without any eye; small, long, and cylindrical muzzle; a single row of teeth in each jaw, the foremost the longest, like pavement on the

pharyngeal bones; six branchial rays; dorsal and anal long; lateral line branching, and bent at the hind part.

GENUS XV. XYRICHTHYS. *Rasos.*

Form compressed; head sharp, and without scales; dorsal long; some scales occasionally on the cheeks; pharyngeal teeth as above; lateral line often interrupted under the dorsal.

GENUS XVI. NOVACULA.

Small scales on the preoperculum and under the eye; neck less elevated; two first rays of dorsal more detached than the others, and prolonged into flexible threads.

GENUS XVII. CHEILINUS.

Lips very thick; a single row of large teeth; large scales on the cheek; lateral line interrupted under the end of the dorsal; scales of the body wide and thin, advancing on to the base of the caudal, none on the dorsal and anal.

GENUS XVIII. EPIBULUS.

Cheeks covered with large scales; five branchial rays; mouth protractile; a single row of small, conical teeth, with two in the middle, like tusks, in the upper jaw, and a similar row on the under jaw, the two middle of which ascend obliquely towards the upper jaw; pharyngeals tuberculous; all the fins prolonged into points; scales wide and large.

Tribe 2.—*Teeth united into bony plates, and making one with the bones of the mouth.*

GENUS I. SCARUS.

Jaws convex, the lower jaw peculiarly constructed, so as to admit of motion; form oblong and heavy; lateral line interrupted under the end of the dorsal; cheeks, opercula, and body covered with large scales.



## GENUS II. CALLYODON.

Teeth imbricated like tiles, those on the sides of the upper jaw far apart and pointed, and a row inside the same jaw, which are much smaller.

## GENUS III. ODAX.

Body and head elongated; muzzle pointed; lips enlarged; scales smaller than those of the *Scarus*; lateral line continuous; jaws less convex and wide; the teeth form two spoons at the extremity of the mouth; teeth on the pharyngeal bones rounded, smaller, more numerous, and closer together than in many others.

The first genus is elegant and regular in form, and its lips appear double, because the skin of the nose, and of the suborbital bones, is prolonged beyond the muzzle, and often covers the lip when the mouth is closed. Some are found in the Mediterranean, but it is chiefly a northern fish; eats Mollusca and Crustacea, congregates in small numbers on rocky coasts, and deposits its spawn among weeds. It never attains a large size; its flesh is white and good, and its colour so brilliant, that it is often called the Sea Parrot.

The *Tautoga nigra* lives among the rocky reefs of Long Island, and has been introduced into Massachusetts Bay; its flesh is much sought after; it is very tenacious of life, and is often taken into marshes to fatten. It sleeps during great cold, which is a more common practice among fishes than is generally believed, and does not revive till the flowering of the dog wood.\*

\* *Cornus florida*.

The Scarus was much celebrated in former times from the ruminating faculty ascribed to it, which appears to be but the extreme trituration of the vegetable food which it eats, and the moveability of its jaw in the manner of ruminating animals: certainly its food remains a long time in its mouth, and is much bruised when it reaches the stomach; but there is nothing in the latter to justify the assertion. It utters a noise, and its intestines are considered a delicacy when cooked with the fish, and supposed to create appetite in the manner of oysters. The species of the Canary Islands little deserves the reputation of that in the Mediterranean.

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FAMILY XV. FISTULARIÆ.

Mouth ending in a long tube.

TABLE LXXIII.

CLASS IV. PISCES.

Series I. FISHES PROPER.

ORDER I. ACANTHOPTERYGII.

FAMILY XV. FISTULARIÆ.

GENUS I. FISTULARIA. *Bouche en flute.*

Muzzle prolonged into a tube, with the jaws at the end; mouth small; head long; body cylindrical, and slender; six or seven branchial rays; scales invisible.

Subgenus 1. *FISTULARIA* PROPER. — One dorsal, which with the anal, is mostly composed of soft rays; teeth small; a long filament in the middle of the caudal; tube of muzzle long and flattened.

2. *AULOSTOMUS*. — Dorsal preceded by several free spines; body scaly, enlarged, and compressed between the dorsal and anal; tail short and slender; tube of muzzle shorter and thicker than above.

GENUS II. *CENTRISCUS*. *Bécasses de Mer*.

Body oval or oblong, compressed at the sides, sharp underneath; two or three branchial rays; first dorsal spiny; small ventrals behind the pectorals; mouth very small and oblique.

Subgenus 1. *CENTRISCUS* PROPER. — First dorsal placed far back; the first spine long and powerful, supported by an appendage from the shoulder and head, which has large, dentated plates; scales small.

2. *AMPHISILE*. — Back armed with wide, scaly pieces, of which the first spine of the dorsal looks like a continuation.

The long tube into which the muzzle of these fishes is prolonged has given them their common name. The first genus of *Fistulariæ* Proper has a long filament proceeding from between the two lobes of its caudal fin, and is found in the seas of warm climates.

## ORDER II. MALACOPTERYGII ABDOMINALES.

Ventral fins placed behind the pectorals.

We have now reached the second order of Fishes Proper (see TABLE LXXIV.), the first name of which is carried on through two others, and means, that the fins are soft, and the rays mostly flexible.\* The second appellation signifies, that the ventral fins are placed on the belly.

### TABLE LXXIV.

#### CLASS IV. PISCES.

##### Series I. FISHES PROPER.

## ORDER II. MALACOPTERYGII ABDOMINALES.

Family 1. SILUROIDES. — Dorsal small; having no visible spines, and placed on the front of the body; anal very long, occupying the whole of the belly, and sometimes appearing to be one with the caudal; carding teeth on both jaws, and a band within the mouth.

Family 2. CYPRINOIDES. — Mouth small, not protractile; jaws feeble; pharyngeal bones armed with teeth, opposed to a cartilaginous plate; three branchial rays; body scaly.

\* These rays are jointed or branching, and sometimes both.

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Family 3. SALMONES. *Salmonidæ*. — First dorsal with soft rays, the second small and adipous; body scaly.

Family 4. CLUPEÆ. — Body scaly and compressed; branchial openings large.

Family 5. ESOX. — Sharp teeth within the jaws; anal opposite the dorsal.

The first family is that of the Siluroides (see TABLE LXXV.), the rays of whose fins are more bony than others of the Malacopterygii, and are consequently nearest to the preceding order. They are chiefly found in the fresh waters of warm countries; but among the three hundred species, some wander into the sea and regions which are cold from their latitude or elevation. None of them have any suboperculum.

TABLE LXXV.

CLASS IV. PISCES.

Series I. FISHES PROPER.

ORDER II. MALACOPTERYGII ABDOMINALES.

FAMILY I. SILUROIDES.

GENUS I. SILURUS.

No perceptible spines in the dorsal; carding teeth in both jaws, and a band within the mouth; several barbs.

Subgenus 1. SCHILBÉ. — A very strong, dentated spine in the dorsal; neck raised; head flattened and wide; body much compressed.

2. CETOPSIS. — Scarcely any eyes; head obtuse and truncated; six short barbs; branchial orifice small, immediately before the pectorals; nine

branchial rays; anal divided into two lobes; a mucous cavity above the base of the pectorals.

### GENUS II. BAGRUS.

An adipous fin behind the dorsal; teeth like those of *Silurus*; number of barbs varies.

Subgenus 1. *PHRACTOCEPHALUS*. — Incomplete bony rays in the upper edge of the adipous fin; head flattened; a bony casque, deeply carved or notched, and a large plate or shield before the first spinal ray of the dorsal; nine branchial rays; six barbs.

2. *PLATYSTOMA*. — Muzzle flattened; teeth in the mouth divided into two sets.

3. *GALEICHTHYS*. *Cat fish*. — Head round, covered with skin; six branchial rays; six barbs.

Section 1. *PANGASIUS*. — Four barbs, long and flattened.

4. *SILUNDIA*. *Silondies*. — Small, smooth head; adipous fin very small; anal long; two almost imperceptible barbs; twelve branchial rays; teeth rather longer than in others.

### GENUS III. ARIUS.

Teeth on the palate divided into two distinct groupes; head frequently enlarged like a casque.

Section 1. Teeth soft, or like a carding comb.

2. Teeth like pavement.

### GENUS IV. PIMELODUS.

Six or eight barbs; some with a casque on the head, others without.

### GENUS V. AUCHENIPTERUS.

Small head; teeth almost imperceptible; adipous fin; five branchial rays; no teeth on the palate; first dorsal placed very forward; casque on the head.

GENUS VI. HYPOPTHALMUS.

Fourteen branchial rays; no teeth; eye just above the angle of the mouth.

GENUS VII. SYNODONTIS. *Schals.*

Casque and shield of the neck much developed; pectoral spinal enormous and dentated; long, pointed, and sharp dorsal spine; muzzle narrow in front; in front of the lower jaw a bundle of closely-set teeth, like very thin plates, each attached to a flexible stem as fine as a hair, and terminated by a very pointed, curved hook, of a golden colour.

GENUS VIII. DORAS.

Armour of the head and neck like that of the Auchenipterus; dorsal and pectoral spines large and strongly dentated.

Section 1. Wide bands of soft teeth in each jaw; muzzle flattened.

2. Mouth like a round hole in a conical muzzle; two small groupes of teeth in the lower jaw only.

GENUS IX. CALLICHTHYS.

Adipous fin with one ray in its foremost edge; shield consisting of two rows of narrow plates on each side; casque on the head; mouth small, almost without teeth; two barbs at each angle; three branchial rays.

GENUS X. ARGES.

Teeth divided into two parts at the extremity, each curving inwards; no palate teeth; two barbs on the jaws; first dorsal small; adipous long; the other fins have their first rays prolonged into filaments.

GENUS XI. BRONTES.

No adipous fin; head flattened; eyes on the top; external rays prolonged.

## GENUS XII. ASTROBLEPUS.

Characters as above; but no ventral fins.

## GENUS XIII. CLARIAS.

No shield on the neck, but the temples and cheeks armed with bony pieces; suborbitals more developed than in others; teeth within the mouth; head flattened, obtuse; body long; long and shallow dorsal without a spine; sometimes an adipous fin; pectoral spine small; bony arches which support the branchiæ divided into branches; from nine to eleven branchial rays; a bony casque on the head.

Subgenus 1. *CLARIAS PROPER*. — The dorsal fin occupying the whole length of the body.

2. *HETEROBRANCHUS*. *Halés*. — Dorsal short, followed by an adipous fin.

## GENUS XIV. SACCOBRANCHUS.

Skull enlarged in front, and at the back; soft teeth on the jaws, and within the mouth; seven branchial rays; eight barbs; between the muscles of the back, and extended above the vertebræ are two bags of considerable length, to which there are two orifices, situated above and behind the branchiæ.

## GENUS XV. PLOTOSUS.

Body long, ending in a point; a second long and rayed dorsal, united to the caudal and anal; no casque on the head; strong conical teeth in each jaw; pavement teeth within the mouth; eight barbs; dorsal and pectoral spines small, but pointed, sharp and dentated; head covered with soft skin like the rest of the body; lips fleshy.

## GENUS XVI. ASPREDO.

Opercula fixed and immoveable; head and fore part of body much flattened; slender tail, sharp underneath; five branchial rays; dorsal of moderate length; anal long; no adipous fin; pectoral spines flattened and dentated.



GENUS XVII. CHACA.

Head flattened and very wide; a wide band of soft teeth in each jaw, and on the pharyngeal bones; mouth much cleft; eye very small; nine barbs; pectoral spine very short, with three sharp prickles; two dorsals, the second united to the caudal, which is also united to a second anal.

GENUS XVIII. SISOR.

Skin soft; no scales or shields; mouth surrounded by fourteen barbs; two dorsals, the last of which has but one ray; lips fleshy; mouth small and without teeth; flat, tuberculous bones on the top of the head; four branchial rays; eyes small.

GENUS XIX. LORICARIA.

Head flattened; body covered with scaly pieces, each having a keel; tail slender and compressed; barbs and fleshy tubercles on the lip; no adipous fin.

Subgenus 1. RINELEPIS.—Scales covered with asperities like a file; body thick and clumsy; no adipous fin; three branchial rays.

GENUS XX. HYPOSTOMUS.

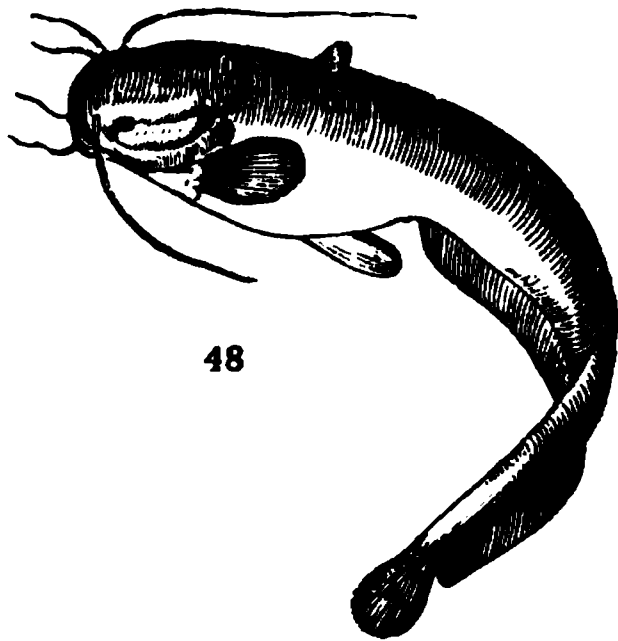
Adipous fin has a bony ray; body thick and short, and head especially thick and rough; a barb at each angle of the mouth; five rows of bony pieces on the body.

GENUS XXI. MALAPTERURUS.

No first dorsal, and only the adipous fin; body thick and short; head flattened; tail compressed; a soft, loose skin upon the head; lips fleshy; six barbs; a band of soft teeth in each jaw; seven branchial rays hidden under the skin; skin when touched feels like cotton; power of giving electric shocks.

Only one species of *Silurus* belongs to Europe, which is the *Saluth* of the Swiss, the *Wels* and *Schaid*

of the Germans, and is found in certain lakes in Switzerland, but not that of Geneva: it was thrown into that of Zurich, but there perished. It is abundant in the Elbe, the Danube, and all the rivers of Hungary; is widely spread over Bohemia, Sweden, Prussia, Russia, &c.; its habits are slothful; it frequents deep waters with beds of clay, and comes to the surface during storms. The



fishermen of the Spree say it is only taken in numbers when it thunders. It is very voracious, and is said only to spare the perch on account of its fins; it also destroys aquatic birds, and M. Valenciennes was told, when travelling with Baron Humboldt in Prussia, that a whole infant had been found in its stomach. In Hungary, they speak of children and young girls being devoured by it; and, on the frontiers of Turkey, it is asserted that a poor fisherman found the body of a woman with a ring on, and a purse full of gold, in the stomach of a Silurus. These stories will convey an idea of its size. Gmelin declares, that when the ground is inundated, the Silurus shakes shrubs and small trees with its tail, when terrestrial animals have taken refuge in them, and that they, with birds in their nests, consequently fall into the mouth of the destroyer. The flesh is perfectly white,

but opinions differ respecting its flavour. Its fat parts are dried in Hungary, and cooked with vegetables; they also serve as oil, and the swimming bladder makes a very strong cement. The Russian and Tartar peasants convert its dried skin into windows, as a substitute for glass; and Aristotle says, that the male watches the eggs for forty or fifty days.

The *Synodontis membranaceus* almost always swims upon its back, but when threatened by any danger, turns and proceeds in the usual manner. This singular propensity was remarked by the ancient Egyptians and represented on some of their tombs. The *Doras Hancockii*, or *costatus*, is said to go in numbers during the night in search of other waters, when its previous habitation dries up, and many of its companions bury themselves in the mud. Mr. Hancock asserts, that a friend of his once met a great many thus making their peregrinations; that they will live for hours, even when exposed to the sun, and that they secrete much water. He adds, that they make a nest of leaves, cover the eggs over when laid, and both male and female defend them till they are hatched.

The *Arges* were discovered by Mr. Pentland, the able naturalist, and Consul General of Bolivia. They are among those fishes which are thrown out by the volcanic eruptions of Cotopaxi; and the *Arges Cyclopeum* lives in the highest regions of the globe. The *Brontes* are from the streams which descend from Cotopaxi, and with the *Astroblepus* were made known by Baron Humboldt; both issue from the

interior of burning mountains, and are thrown to a distance during eruptions. On one occasion Cotopaxi ejected so many, that the putrid odour arising from them was perceived at a great distance. In 1691 Cargueirazo sent thousands forth, and the pestilential fevers which followed were mainly attributed to the unhealthy exhalations arising from them.

All the known species of Loricaria come from South America, and principally from the hottest parts. Nevertheless Mr. Pentland found them more than five thousand yards from the level of the sea.

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FAMILY II. CYPRINOIDES.

Mouth small ; no teeth in the jaws.

TABLE LXXVI.

CLASS IV. PISCES.

Series I. FISHES PROPER.

ORDER II. MALACOPTERYGII ABDOMINALES.

FAMILY II. CYPRINOIDES.

GENUS I. CYPRINUS. *Carpes.*

Dorsal long, with three sharp spiny rays, the third the longest and often dentated at the back ; two strong solid rays in the

anal; teeth on the pharyngeal bones; body thick; scales thick and striated; three strong, flat, branchial rays.

Subgenus 1. *CYPRINUS PROPER.* *Carp.* — Line from the muzzle to the tail arched; mouth small, no teeth on the jaws; lips thick and fleshy; three barbs.

2. *BARBUS.* *Barbel, Barbeaux.* — Body more or less spindle-shaped; dorsal short; four barbs; pharyngeal teeth conical, long, a little crook'd.

3. *LABEOBARBUS.* — Five barbs; a spiny ray not dentated in the dorsal; anal short.

4. *SCHIZOTHORAX.* — Four barbs; a bony, dentated ray in the dorsal; pharyngeal teeth like those of the Barbel; body round in front, compressed behind; scales much smaller than above; a fold of skin behind the ventrals, which covers the first rays of the anal, the edges of which are covered with large scales.

Section 1. Lips thin and sharp; the lower lip covered with a thin, membranous and polished cartilage; the lower jaw horizontal.

2. Lips thin and soft; the overhanging edge of the lower jaw notched in the middle.

3. Lips thick and smooth.

Subgenus 5. *OREINUS.* — Head fleshy; muzzle overhanging the mouth; scales very small; barbs; a small dentated spine in the dorsal.

6. *DANGILA.* — Dorsal as long as that of the *Carp Proper*, but without its dentated spine; a border of conical papillæ on the upper lip, which, with the lower, are both thin; four barbs.

7. *NURIA.* — Dorsal placed on the hinder part of the body; no spiny rays; lips thin; a barb at each angle.

Subgenus 8. **ROHTA.** — Lips thick, fleshy, and having a fringed edge; four barbs; a thick fold of skin advances upon them, so as to make a more or less obtuse muzzle above them, and covering the mouth when closed.

9. **CAPOËTA.** — Two long barbs.

Section 1. One bony, dentated ray in the dorsal.

2. One hard, smooth ray in the dorsal.

3. Dorsal ray soft.

10. **CIRRHINA.** — Barbs in the middle of the upper lip; no spines on the dorsal; lips thin.

11. **GOBIO.** *Gudgeon, Goujons.* — Barbs at the angle of the mouth; teeth conical, slightly curved, and in two rows.

12. **TINCA.** *Tench, Tanches.* — Body clumsy and wide, covered with small scales; two short barbs at the angle of the mouth.

13. **LABEO.** — Muzzle thick and fleshy, advancing over the mouth, the opening of which is covered by a triple row of lips; a small barb at the angle of each jaw; first rays of dorsal, simple and slender, the others branching, and all flexible.

14. **ABRAMIS.** *Bream, Brêmes.* — Neither spines nor barbs; dorsal short, placed behind the ventrals; anal long.

15. **CATASTOMUS.** — Thick, hanging, and fringed, or indented lips; dorsal short, placed over the anal.

16. **LEUCISCUS.** *Chub, Ables, Poissons Blancs.* — Dorsal and anal short; no spines or barbs.

17. **CHELA.** — Dorsal placed over the commencement of the anal.

18. **GONORHYNCHUS.** *Gonorhinques.* — Body and head long, covered, as well as the opercula,

and even the membrane of the gills, with little scales; muzzle projecting; mouth small; no teeth; no barbs; three branchial rays; dorsal above the ventrals.

GENUS II. COBITIS. *Loach, Loche, Groundling, Dormilles.*

Head small; body long, clumsy, and covered with little scales; ventrals placed far back; a small dorsal above them; mouth small and no teeth; three branchial rays; barbs.

GENUS III. ANABLEPS.

Eyes very projecting and head advancing beyond them; they are divided in two by a band, so that the pupil looks double; body cylindrical, covered with strong scales; five branchial rays; head flattened; jaw teeth soft; pectorals scaly; dorsal small, placed behind the anal.

GENUS IV. PÆCILIA.

Jaws flattened and protractile, with a row of very fine small teeth; head flat above; opercula large; five branchial rays; dorsal above the anal.

GENUS V. LEBIAS.

Teeth notched; other characters as above.

GENUS VI. FUNDULUS. *Fondules.*

Teeth soft, the foremost row crook'd; some conical and longer within the mouth; four branchial rays; other characters like those of Pæcilia.

GENUS VII. MOLINESIA.

Anal between the ventrals, and under the beginning of the large dorsal; teeth as above; four or five branchial rays.

GENUS VIII. CYPRINODON

Teeth soft; six branchial rays; other characters like those of the above three genera.

The Carp seems to have been the *Cyprinus* of the ancients, and, in all times, to have been celebrated for the long time which it lives out of water. M. Valenciennes relates some curious experiments, in which he subjected these fishes to different temperatures, and apparently killed them by warm water, but when immersed in cold water, or placed upon cold marble, they returned to life. At a high temperature, a mucous secretion issued from the pores of their head, and, in fact, from the whole of the body. The common Carp were introduced into England in 1496, and are now extremely plentiful, but they do not thrive further north. They will live in the sea, where they acquire 60 lbs. weight, and abound in the Caspian Lake. The Kalmuck Tartars make waistcoats of their skin, tanned with a species of *Statice* \*, which resist humidity. They live to a great age, and then are so cunning that it becomes difficult to capture them. They leap in the manner of salmon, but not to such a height. Their lives endure at least two hundred years, and they are subject to diseases which deform them.

Gold and Silver Fishes† are a species of Carp which come from China, and will not survive any intense cold. They seem always to have been an ornamental luxury, and were sent to England in 1611. The first seen in France were given to Madame de Pompadour. They thrive particularly well in those reservoirs into which the warm water from steam-

\* *S. coriaria*.

† *Cyprinus auratus*.



engines is poured, and which sometimes rises to 80 degrees; and they fatten upon the refuse grease which is thrown out with the water. Their anal fins are sometimes double, and their caudals trebled; but this at the expense of their other fins. Several monstrosities are figured in the Chinese drawings.

The Barbel is principally esteemed in England on account of the sport, which, from its strength, it affords to the fisherman. Its chief power lies in its tail, and it is kept in the wells of boats, where, by the lashing about of this part, mud is prevented from accumulating; hence its local name of kitchen-maid. The poorer classes on the borders of the Thames, fry it with slices of bacon to correct the dryness of its flesh. \*

In the genus *Labeo* are also many of our fresh-water fishes; for instance, the Bream, with its large, compressed body and insipid flesh; the Ide or Gardon; the Roach; the Blue Roach, only found in Lancashire; the Dace; the Graining, with the same single locality as the Blue Roach; the Chub, with its short thick head; and the Rudd, which afforded the author an example of the value of local names. She had seen it in the Stour, and afterwards went seven miles further up the river to draw it, but on enquiring for it, a total ignorance of its existence was manifested. On

\* The guide which has been followed for this brief description of Fishes here ceases; for the great work of Cuvier, so worthily continued by M. Valenciennes, does not, as yet, reach further than the sixteenth volume, and a portion of the family of Cyprinoides.

making a rude sketch of it, and showing it to some fishermen, they instantly exclaimed, "Oh! it is the Shallow you want; you shall have it in an hour, ma'am;" and the men performed their promise. Add to these the Bleak, with its silvery sides, the scales of which are used in making artificial pearls; and which, from being tormented by internal worms, tumbles about in such agony that it is called the Mad Bleak; the tiny Minnow; and the Loach, so restless before and during stormy weather, which leaps so high when its tail is touched; and all of which are more or less esteemed for the table.

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## FAMILY III. SALMONIDÆ.

Body scaly; the first dorsal fin supported by soft rays; an adipous fin.

The Genus *Salmo* (see TABLE LXXVII.), so interesting to the eye from its beauty, and so grateful to the palate from its flavour, has perhaps caused more discussion than any other groupe of fishes. Its numerous species; its different appearance according to age; the infinite variety produced, not only in every separate, but even in the same stream; the local names attached to it in every stage, so that the same fish bears three or four appellations during its life; all produce a confusion which at present seems far from elucidation.

TABLE LXXVII.

CLASS IV. PISCES.

Series I. FISHES PROPER.

ORDER II. MALACOPTERYGII ABDOMINALES.

FAMILY III. SALMONES. *Salmonidæ*.

GENUS I. SALMO. *Salmon*.

First dorsal with soft rays, followed by a second which is adipous.

- Subgenus 1. SALMO PROPER. *Trout, Truites*. — Small pointed teeth on the jaws, within the mouth, and on the tongue; lower jaw curves upwards with age, and a depression exists in the upper, in order to receive it, when the mouth is closed; ventrals correspond with the middle of the first dorsal; the adipous fin to the anal; ten branchial rays, or thereabouts.
2. OSMERUS. *Smelts, Eperlans*. — The palate teeth wide apart; eight branchial rays; ventrals placed under the foremost edge of the first dorsal.
3. MALLOTUS. *Loddes*. — Soft teeth everywhere; eight branchial rays; scales small; first dorsal and ventrals placed far back; wide and round pectorals.
4. THYMALLUS. *Grayling, Ombres*. — Teeth very fine; mouth small; first dorsal long and deep, placed above the ventrals; scales large; seven or eight branchial rays.
5. COREGONUS. *Vendace, Lavarets*. — Frequently no

teeth ; scales still larger than the above ; first dorsal not so long as deep.

- Subgenus 6. ARGENTINA. — Mouth small ; no teeth in the jaws ; mouth flattened ; strong crook'd teeth on the tongue ; six branchial rays.
7. CURIMATES. — No teeth on the tongue ; other characters like those of Graylings.
  8. ANASTOMUS. — Form of Graylings ; a row of small teeth in each jaw ; the lower jaw raised before the upper and enlarged, so that the little mouth looks like a crack at the end of the muzzle.
  9. GASTEROPELECUS. *Serpes.* — Mouth as above ; belly compressed, projecting and sharp ; ventrals very small, and placed far back ; anal long ; first dorsal above it ; conical teeth in the upper jaw ; sharp, notched teeth below.
  10. PIABUQUES. — Head and mouth of Graylings ; body compressed ; keel of the belly sharp, but not dentated ; anal very long ; first dorsal corresponds to its commencement.
  11. SERRA-SALMES. — Body deep and compressed ; belly sharp and dentated like a saw ; teeth sharp, triangular, and notched.
  12. TETRAGONOPTERUS. — Anal long ; teeth as above ; mouth small ; belly smooth.
  13. CHALCEUS. — Mouth and teeth as above ; body oblong and small ; round teeth in the jaw.
  14. MYLETES. *Raiis.* — Teeth short, triangular, rounded at the corners, and the upper surface so hollowed by use as to make the angles like three projecting points ; some species have false, upright fins, and the belly of the Serra-Salmes ; tongue and palate smooth.
  15. HYDROCYON. *Hydrocyns.* — Tongue smooth ;

teeth vary in the species; suborbital bone covers the cheek; position of dorsal varies.

Subgenus 16. *CITHERINUS*. — Mouth flattened; tongue and palate smooth; adipous fin covered with scales, as well as a great part of the caudal.

17. *SAURUS*. — Muzzle short; mouth cleft to behind the eyes; many pointed teeth on the jaws, palate, tongue, and back of the mouth; from eight to fifteen branchial rays; first dorsal placed a little behind the ventrals, which are large; scales on the body, cheeks, and opercula.

18. *SCOPELUS*. *Serpes*. — Mouth and gills very large; very small teeth on each jaw; muzzle very short and obtuse; nine or ten branchial rays; a small dorsal behind the first, with vestiges of rays.

19. *AULOPUS*. — Mouth large; teeth like a carding comb within the mouth, none on the jaws; tongue smooth; ventrals almost under the pectorals; external rays thick, and forked; first dorsal corresponds to the first half of the space which separates the ventrals from the anal; twelve branchial rays; large ciliated scales on the body, cheeks, and opercula.

## GENUS II. STERNOPTYX.

Body deep and compressed; mouth on the upper surface of the muzzle; a sharp crest on the shoulders, ending in a spine; another just before the ventrals, which are very small; a crest before the dorsal, and a little membranous tubercle instead of the adipous fin.

Salmon frequent rivers, lakes, and seas, and retire to the fresh water to deposit their spawn. Some of the Trout live entirely in inland streams, particularly delighting in those which proceed from

mountains. All frequent the same spots for years; and, when they can, return to the sea after spawning; but they are then in a lean and feeble condition. They leap many feet when they wish to ascend a fall; and even when weighing seventy-four pounds, their flesh is not coarse. If perfectly fresh, young children may eat of them with impunity, but they become rich and less easy of digestion, even after being kept for twenty-four hours. Fishing for them seems to excite the keenest delight, and books have been written on this subject, which interest even those who do not practise the art.\* It is particularly a fish of northern climates, and is one of the greatest treasures which the waters yield to man.

Smelts are both brilliant and delicate in their colouring, inhabit brackish water and the sea, and possess a fragrant smell. The Grayling is remarkable for being in season when that for Trouts is past, and for the beauty of its dorsal fin, which is thickly spotted with bright colours. The Vendace is reported to have been introduced into Scotland by Mary Queen of Scots, and is only found in the lakes of Dumfriesshire, especially Loch Maben. It is said not to live in any other water in the United Kingdoms; but this and its regal introduction are, of course, but mere tradition. It resembles the Smelt in flavour. Some of the genera of Salmonidæ frequent the seas and rivers of other countries, many of which are situated in warm latitudes.

\* Among these are the "Salmonia" of Sir Humphry Davy, and the "Days and Nights of Salmon Fishing" by Mr. Scrope.

## FAMILY IV. CLUPEÆ.

No adipous fin; body very scaly.

The German name of Heer, from which our word Herring is taken (see TABLE LXXVIII.), implies an army, and is well bestowed on the immense multitudes of these fishes, which annually appear on the British and neighbouring coasts. The story of their migrations is rejected by Mr. Yarrell and other recent naturalists; the former of whom states, that they inhabit the deep waters all round our shores, where they may be occasionally caught in any month of the year; but that they periodically approach the land in order to deposit their spawn.

## TABLE LXXVIII.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER II. MALACOPTERYGII ABDOMINALES.

## FAMILY IV. CLUPEÆ.

GENUS I. CLUPEA. *Herring, Harengs.*

Only the sides of the jaws protractile; lower edge of the body, which is much compressed, dentated like a saw by the arrangement of the scales; gills very large; a great number of very fine bones.

subgenus 1. HERRINGS PROPER. — Jaws arched in front, and divided longitudinally into several pieces; upper lip not notched.

2. ALOSA. *Shad.* — A notch in the middle of the upper jaw.

Subgenus 3. **CHATOBSSUS.** *Cailleu-Tassarts.* — Last ray of the dorsal prolonged into a filament; mouth small; no teeth.

**GENUS II. GNATHOBOLUS.** *Odontognathus.*

Body much compressed, with sharp dentations underneath; anal long and shallow; a very small, fragile dorsal, which is almost always destroyed; six branchial rays; jaw a little prolonged into a point, and provided with small teeth, leaning forwards; no apparent ventrals.

**GENUS III. PRISTIGASTER.**

Head and teeth of Herrings Proper; four branchial rays; no apparent ventrals; belly much compressed, forming a sharp and dentated arch.

**GENUS IV. NOTOPTERUS.**

Scales on the opercula and cheeks; opercula and suborbital bone dentated; fine teeth in the mouth and on the jaws; Strong, crook'd teeth on the tongue; one strong, bony, branchial ray; ventrals almost invisible; anal very long, united to the caudal; dorsal small, and opposite the middle of the anal.

**GENUS V. ENGRAULIS.** *Anchovy, Anchois.*

Mouth cleft to behind the eyes; gills very large; twelve or more branchial rays; small pointed muzzle.

Subgenus 1. **THRYSSA.** — Belly dentated; jaws much prolonged.

**GENUS VI. MEGALOPS.**

Jaws and form of Herrings, but belly not sharp, nor body compressed; soft teeth on the jaws and within the mouth; twenty-two to twenty-four branchial rays; last ray of the dorsal, and frequently that of the anal, prolonged.



GENUS VII. ELOPS.

Characters as above, but the dorsal ray not prolonged; thirty branchial rays; soft teeth on the jaws; a flat spine on each side of the caudal fin.

GENUS VIII. CHIROCENTRUS.

Strong, conical teeth on the jaws, the two middle teeth of each row extraordinarily long; carding teeth on the tongue; seven or eight branchial rays; a large, pointed, membranous scale above and below each pectoral; pectoral rays very hard; body long, compressed and sharp; ventrals very small; dorsal shorter than anal, and opposite to it.

GENUS IX. BUTIRINUS.

Jaws of Herrings, body of Elops, muzzle of Anchovies; mouth small; soft teeth on the jaws; twelve to thirteen branchial rays; teeth like pavement on the tongue, and within the mouth.

GENUS X. HYODON.

Form of Herrings, but belly not dentated; dorsal opposite the anal; eight or nine branchial rays; crook'd teeth on the jaws, within the mouth, and on the tongue.

GENUS XI. ERYTHRINUS.

Conical teeth in each jaw, those in front the longest; soft teeth on the palate; five broad, branchial rays; head round, blunt, provided with hard bones and scales; hard suborbitals cover the cheeks; body oblong, and covered with carp-like scales; dorsal over the ventrals.

GENUS XII. AMIA. *Amies.*

Jaws, teeth, head and scales like those of Erythrinus; twelve broad, branchial rays; a bony plate between the branches of the lower jaw; teeth like pavement behind the conical teeth; dorsal begins between the pectorals and ventrals, and extends nearly to the caudal; anal short; a tubular appendage to each nostril.

GENUS XIII. SUDIS. *Vastrès.*

Characters of *Erythrinus*, except that their dorsal and anal are opposite to each other, and occupy the last third of the body.

## GENUS XIV. OSTEOGLOSSUM.

Two barbs on the chin; anal united to the caudal; tongue bony and extremely rough, its little, short teeth serving as a rasp; other characters like those of *Sudis*.

## GENUS XV. LEPISOSTEUS.

Jaws of equal length; teeth within them like a grater, and sharp teeth on their edge; gills united under their throat by the membrane, which has three rays on each side; scales as hard as stones; dorsal opposite anal, and placed far back; the two extreme rays of the tail, and the first of all the fins, covered with scales, giving a dentated appearance.

GENUS XVI. POLYPTERUS. *Bichers*

Upper jaw immoveable; a bony piece, shagreened, like the rest of the head, covers the cheeks; one flat, branchial ray; scales as above; body long; a number of separate fins along the back, each supported by a strong spine, which bears some soft rays; caudal encircles the end of the tail; anal close to it; ventrals placed far back; pectorals on a scaly stem; a row of conical teeth round each jaw, and soft, rasping teeth behind.

Herrings are capricious fishes, and without any apparent reason to us, desert and frequent different places; for which some reason, however, is always assigned by fishermen, &c. Dr. M'Culloch gives an amusing account of the various local traditions which accompany these changes; among others, that Herrings have been frightened from the Baltic by the battle of Copenhagen; then that steam-boats have

alarmed them: but the best of all is related by Mr. Yarrell, and is that of a clergyman having been appointed to a living on the coast of Ireland, who, signifying his intention of taking a tithe of the fish, so affronted the Herrings that not one of them has visited that part of the shore from that time. They assemble two or three months before they spawn, which, in England, takes place in October and November. Dark nights, accompanied by a breeze, generally prove most successful, and there is no enumerating the multitudes which are yearly brought ashore in the nets. The species called Pilchard, which is shorter and thicker, more particularly frequents Cornwall, France, and Spain; and one boat will, in a single night, often secure twenty thousand. Great caution is obliged to be used in extricating them, as the agitation of such numbers would sink the whole. A week will elapse before the entire produce of one night's fishing is taken ashore, part only being daily freed, and the rest left inclosed in the sean or large net, immersed in the water. The greatest number on record, as taken by one drag of the sean, is three thousand hogsheads, and three thousand five hundred fishes go to each hogshead; making four millions and a half. The Sprat is a smaller species of Herring, and its numbers have often been so great as to afford manure for the land near the coasts. The White Bait is a still smaller species, and for years was supposed to be the fry of other fishes. It appears in the Thames from the beginning of April to the end of September, but never comes be-

yond the extent of brackish water as brought by the tide, and disappears with it at the reflux. The Sardinha abounds in the Mediterranean and coasts of Portugal and Bretagne. It has a much finer flavour than the Herring, and is often substituted for anchovies. It is so plentiful in Lisbon, that servants in respectable families think themselves aggrieved if asked to eat it. It is cooked all day long in the public kitchens, to which the poorer classes repair; and, consequently, some of the streets of this city are, during the season, never free from the smell of the Sardinha.

The Anchovy, according to Mr. Yarrell, was one of the fishes from which the Roman Garum was made. It is plentiful in the Mediterranean, and occasionally repairs to the English and Norwegian coasts, and to the Baltic.

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#### FAMILY V. ESOCES.

No adipous fin; the maxillary bone without teeth and hidden by the lips.

The type, or principal genus of the Esoces (see TABLE LXXIX.) is often called the Fresh-water Shark, and is an European fish, though it has not always been common in England. Edward the First, when he fixed the prices of fish brought to market, gave it a higher value than the salmon, and ten times higher than that of the cod and turbot.

TABLE LXXIX.

CLASS IV. PISCES.

Series I. FISHES PROPER.

ORDER II. MALACOPTERYGII ABDOMINALES.

FAMILY V. ESOX. *Esoces.*

GENUS I. ESOX PROPER. *Pike, Pickerell, Jack, Luce, Brochets.*

A number of small teeth within the jaws, inside the mouth, and on the tongue, those of the two latter like a carding comb. A series of long, pointed teeth on the lower jaw; muzzle long, wide, and flattened; each jaw curving with age; the dorsal placed opposite the anal.

- Subgenus 1. GALAXIAS. — No apparent scales; mouth small; teeth pointed and moderate on the jaws, and in the mouth; strong, crook'd teeth on the tongue.
2. ALEPOCEPHALUS. — Head without scales; those on the body wide; mouth small; teeth soft; eyes large; eight branchial rays.
3. MICROSTOMA. — Muzzle short, the lower jaw the longest; inside of both jaws provided with very fine teeth; three wide, flat, branchial rays; eyes large; dorsals placed behind the ventrals; lateral line provided with a row of strong scales.
4. STOMIAS. — Muzzle very short; mouth cleft to very near the gills; opercula like little membranous leaflets; long and crook'd teeth within

- the mouth, and on the tongue; body long; ventrals placed far back; dorsal over the anal.
- Subgenus 5. **CHAULIODUS**. — Two teeth in each jaw, crossing each other when the mouth is closed; dorsal placed opposite the space between the pectorals and ventrals; first ray of dorsal long, like a filament.
6. **SALANX**. — Head flattened; four flat branchial rays; jaws short, pointed, each having a row of crook'd teeth.
7. **BELONE**. *Orphies*. — Muzzle long; small teeth on the jaws; the pharyngeal teeth like pavement; scales not apparent, except a row forming a keel on each side of the lower edge; bones green.
8. **SCOMBRESOCES**. *Sairis*. — Muzzle and scales as above; last rays of dorsal and anal detached into false fins.
9. **HEMI-RAMPHUS**. *Demi-becs*. — Small teeth inside the jaws; lower jaw projects in a point like a beak.

## GENUS II. EXOCETUS. *Flying Fishes, Exocets.*

Pectorals enormous, and able to support the fish in the air; head and body scaly; a row of keeled scales forms a projecting line at the bottom of each side; head flattened; dorsal over the anal; eyes large; small pointed teeth on the jaws; pharyngeal teeth like pavement.

## GENUS III. MORMYRUS.

Body compressed, oblong and scaly; tail enlarged towards the fin; head covered with a thick, naked skin; five or six branchial rays; mouth small; notched teeth within the jaws, and a band of soft teeth within the mouth, and on the tongue.

Pike are very strong, fierce, and voracious, not only devouring other fishes, but ducks, moorhens, and other small animals, alive or dead, and do not hesitate seizing human beings, whom they have been known to lacerate dreadfully. A skeleton nineteen feet long is to be seen at Manheim, of a Pike which was taken at Hailbrun, in Suabia, in the year 1497, with a brazen ring on it; and on this ring was engraved, in Greek characters, "I am the fish which was first of all put into this lake, by the hands of the Governor of the Universe, Frederick the Second, the 5th of October, 1230." It was therefore 267 years old, and is said to have weighed 300 lbs. Some of the Irish lakes have contained Pike of 70 lbs. They are particularly good when they feed upon smelts, which they do in the Medway. Hooks used to be tied to the legs of geese, in order to catch Pike, when a struggle ensued, in which the former were generally victorious.

The Mackarel guide, or Gar fish, is a Pike of the sea, and as it precedes the yearly visits of the Mackarel, has received the former name. Its bones are green; it is a very lively, flexible fish, and a strong smell issues from it when taken, which, however, does not prevent it from being often eaten.

The Exocetus, or Flying Fish, is small, and like other flying fishes is supported in the air by its large pectoral fins when it is pursued by its devouring enemies. It frequents the Mediterranean and the tropical

seas, and has been caught in England. Its flesh is delicately flavoured, but there is not much of it. It

looks very pretty as it issues from the water in multitudes ; a rushing noise is heard, and numbers of blue and silver creatures are seen in the air, which dip again into the sea, only to come forth afresh, and but too often fall a prey to winged destroyers. They are attracted by light, and lanthorns were hung at night on the rigging of a vessel in which the author once sailed, and by this means a supply was often secured for breakfast.

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### ORDER IIL MALACOPTERYGII SUBRACHII.

This order is characterised by having its ventrals placed under the pectorals.



TABLE LXXX.

CLASS IV. PISCES.

Series I. FISHES PROPER.

ORDER III. MALACOPTERYGII SUBRACHIL.

- Family 1. GADOÏDES. — Ventrals under the throat, and sharpened into a point.
2. FLAT FISHES. *Poissons Plats*. — Both eyes on the same side of the head, and the whole fish more or less irregular in shape.
3. DISCOBOLUS. — Ventrals forming a disk.
- 

FAMILY I. GADOÏDES.

Ventral fins placed under the throat and sharpened into a point.

The first family, that of the Gadoïdes (see TABLE LXXXI.), is almost confined to the great genus Cod, and forms a most important part in the economy of man, as it affords profit and employment to thousands.

TABLE LXXXI.

CLASS IV. PISCES.

Series I. FISHES PROPER.

ORDER III. [MALACOPTERYGII SUBRACHIL.

FAMILY I. GADOÏDES.

GENUS I. GADUS.

Body moderately long ; scales soft, none on the head ; fins soft ;

jaws and front of the mouth provided with pointed, unequal teeth, which are small, moderate in size, arranged in several rows, and like a carding comb or grater; gills large; seven branchial rays; almost all have two or three dorsal fins, and a distinct caudal.

Subgenus 1. **GADUS PROPER.** *Cod, Morues.* — Three dorsals; two anals; a barb on the lower jaw.

2. **MERLANGUS.** *Whittings, Merlans.* — Fins as above; no barbs.

3. **MERLUCCIUS.** *Merluches, Hake, Sea Pike.* — Two dorsal fins; one anal; no barbs.

4. **LOTA.** *Lottes, Ling, Barbot.* — Fins as above; barbs more or less numerous.

5. **MOTELLA.** — First dorsal scarcely visible.

6. **BROSMIUS.** *Torsk, Tusk.* — One long dorsal fin, extending nearly to the tail.

7. **BROTULA.** — Dorsal and anal united to the caudal, and ending in a point.

8. **PHYCIS.** — Ventrals formed of one ray, which is often forked; head large; barb on the chin; two dorsals, the second of which is the longest.

9. **RANICEPS.** *Tadpole Fish.* — Head flatter than others; foremost dorsal almost hidden by the skin.

**GENUS II. MACROURUS.** *Lepidolephus, Grenadiers.*

Muzzle flattened and advancing beyond the mouth; head and body covered with hard and spiny scales; ventrals small; pectorals moderate; first dorsal short and deep; second and anal very long, and united to the caudal; very fine, short teeth in the jaws.

The flesh of the Cod is white, well flavoured, and easily parts into flakes. It is found from Ireland to Gibraltar, and on the north-eastern shores of America.

These fishes will take almost any bait offered to them, and are sometimes kept in salt ponds, where they will come to be fed when called. They are best for the table from October to Christmas, often weigh seventy-eight pounds, and they and their varieties are dried or salted, and sent all over the world. The Haddock is a species of Cod, is excellent when dried, and is one of the St. Peter's fish.

The Hake is from the Northern seas and Mediterranean, and abounds on the Devonshire and Cornish coasts. It is often taken with the Pilchards, and seventeen of the latter have been found at one time in its stomach. The flesh is coarse, and chiefly eaten when salted. The sounds which are pickled and put into barrels, are the swimming bladders of the Ling and Cod; the liver of the former yields an oil which is said to cure rheumatism.

The Barbot, Burbot, or Eel Pout, is the only species of Cod which enters fresh water, and is found in the north of Europe, Asia, and India. It is rare in England, and only exists in a few rivers. It is reckoned good eating, but its ugly head is always cut off before sending it to table.

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#### FAMILY II. FLAT FISHES.

Both eyes placed on the same side; the two sides of the mouth unequal; body much compressed.

In this singularly formed family, the genus *Pleuronectes* (see TABLE LXXXII.) is preeminent for affording wholesome nourishment.

## TABLE LXXXII.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER III. MALACOPTERYGII SUBRACHII.

## FAMILY II. FLAT FISHES.

## GENUS I. PLEURONECTES.

The side on which the eyes are placed remains uppermost when the fish is swimming, and is coloured; the other side is whitish; the two sides of the mouth are unequal, and the pectorals generally so; body much compressed and deep; dorsal all along the back; the anal occupies the under side; the ventrals appear like a continuation of it in front, and are often united to each other; six branchial rays.

- Subgenus 1. PLATESSA. *Plaice, &c., Plies.* — A row of sharp teeth in each jaw; pharyngeal teeth like pavement; the dorsal advances to just above the upper eye; a space between it and the caudal, and between that and the anal; eyes generally on the right side.
2. HIPPOGLOSSUS. *Halibut, &c., Flétans.* — Sharp, strong teeth on the jaws and pharynx; fins as above; form more oblong.
  3. RHOMBUS. *Turbot.* — Teeth as above, only soft, or like carding combs; dorsal advances to the edge of the upper jaw, and reaches nearly to the caudal; eyes generally on the left side.
  4. SOLEA. *Sole.* — Mouth twisted, on the opposite side to the eyes, and on that side only, provided with fine and close, or soft teeth; muzzle

round, almost always advancing beyond the mouth; dorsal begins at the mouth and reaches to the caudal; lateral line straight.

**Subgenus 5. MONOCHIR.** — An extremely small pectoral on the side where the eyes are, and either scarcely visible, or wholly wanting on the other; other characters like those of *Solea*.

6. **ACHIRUS.** — No pectoral fins; upright fins distinct.

7. **PLAGUSIA.** — Upright fins united to the caudal.

Plaice are best at the end of May, are northern fishes, and sometimes found in incredible numbers. The Halibut is one of the largest of the genus; sometimes weighs five hundred pounds, and yields a quantity of oil. The Greenlanders eat it when fresh, cut into strips, which are dried in the air. The Turbot is one of the best of all fishes for the table, and the Dutch are particularly successful in its capture. They are said to have obtained 80,000*l.* per annum from the sale of it in the London market only, and the Danes from 12,000*l.* to 15,000*l.* for lobsters to make sauce for it, and which are caught on the coasts of Norway. Both animals frequent the English shores, and probably might be had there in similar quantities. Turbots were highly prized fishes among the Athenians; they often weigh thirty pounds, and one is on record which attained one hundred and ninety pounds. Some have

both sides dark, and then, after the example of the epicure Quin, are particularly esteemed. The Brill is reckoned inferior to them, but has much the same flavour.

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## FAMILY III. DISCOBOLUS.

The ventral fins, by meeting underneath the body, form a disk.

The disk under the body of the Lepadogasters (see TABLE LXXXIII.) enables them to adhere to any object on which they fix themselves, and the habit of doing so is so strong, that it gives reason to suppose they could not remain long without exercising it, probably as a means of protection.

## TABLE LXXXIII.

## CLASS IV. PISCES.

## Series III. FISHES PROPER.

## ORDER III. MALACOPTERYGII SUBRACHII.

## FAMILY III. DISCOBOLUS.

GENUS I. LEPADOGASTER. *Suckers, Porte-Ecuelle.*

Large pectorals descending towards the lower edge of the body, and uniting under the throat by means of a membrane, which is formed by the union of the ventrals ; body smooth, without scales ; head wide and flattened ; muzzle projecting and extensible ; four or five branchial rays ; one soft dorsal, opposite to a similar anal.

Subgenus 1. **LEPADOGASTER PROPER.** — Membrane of ventrals forming a concave disk under the body; the bones of the shoulder project, which with the membrane uniting the pectorals complete a second disk.

2. **GOBIESOCES.** — Interval between the pectorals and ventrals not divided into a double disk, but forming a simple large one, cleft on each side; dorsal and anal short and distinct.

## GENUS II. CYCLOPTERUS. *Lump-sucker.*

The ventrals form an oval and concave disk, employed as a sucker to fix the fish on to rocks; mouth wide; small pointed teeth on the jaws, and pharyngeal bones; opercula small; six branchial rays; large pectorals, united almost under the throat; skin clammy, and without scales, but covered with little hard grains.

Subgenus 1. **LUMP FISHES.** — First dorsal more or less perceptible, but very shallow, with simple rays; a second with branching rays opposite the anal; body thicker than others.

2. **LIPARIS.** *Sea Snail.* — One long dorsal and anal; body smooth, elongated, and compressed behind.

## ISOLATED GENUS. ECHENEIS. *Remora.*

A flattened disk upon the top of the head, composed of a certain number of cartilaginous plates, dentated, or spiny at the hinder edge; these are moveable, so that the fish is able to fix itself by them on different bodies; body long, covered with small scales; one soft dorsal, opposite the anal; head flat above; eyes on the side; lower jaw projects; small teeth, like a carding comb, and a row like eye-lashes on the edge of the upper jaw; tongue rough; eight branchial rays.

The form of the Lump-sucker is singular ; it takes a wide range in the northern seas, is caught near Edinburgh, and sold there for the table. Pennant relates an experiment made on its powers of adhesion, when it fixed itself at the bottom of a pail holding some gallons of water, and on being lifted up by the tail, water and pail came with it, and there remained.

The Echeneis will probably form the foundation for a new family. It abounds in the Atlantic and Mediterranean, and was known to the Greeks and Romans.

## ORDER IV. MALACOPTERYGII APODI.\*

### FAMILY. ANGUILLIFORMES.

Body long and cylindrical ; scales scarcely perceptible.

This order contains but one family, the first genus of which is the *Muræna* (see TABLE LXXXIV.), and embraces the various species of Eels.

### TABLE LXXXIV.

## CLASS IV. PISCES.

### Series I. FISHES PROPER.

## ORDER IV. MALACOPTERYGII APODI.

### FAMILY. ANGUILLIFORMES.

### GENUS I. MURÆNA. *Anguilles*.

Opercula small, encircled by concentric rays, and with them

\* No ventral fins.



enveloped in the skin, which opens far back by means of a hole or tube; body long and slender; scales encrusted in a thick, fat skin.

- Subgenus 1. **ANGUILLA.** *Muraena*. — Pectoral fins; gills opening under them.
2. **ANGUILLA PROPER.** — Dorsal and caudal reaching to the end of the tail, where they join the caudal and form a point.
  3. **TRUE EELS.** — The dorsal commencing at some distance behind the pectorals.
  4. **CONGER EELS.** *Congres*. — Dorsal commences near the pectorals, or over them; upper jaw the longest.
  5. **OPHISURUS.** — Dorsal and anal terminate before reaching the end of the tail, which has no fin.
  6. **GYMNOTHORAX.** — *Muraena Proper, Muraenopsis*. — No pectorals; opercula and branchial rays so thin, and hidden, that their existence has often been denied.
  7. **SPHAGEBRANCHUS.** — Openings of the branchiæ close together under the throat; upright fins only begin to project near the tail; muzzle long and pointed.
  8. **APTERICHTES.** — No fins at all.
  9. **MONOPTÈRE.** — Orifices of branchiæ united so as to form a slit under the throat, divided in the middle by a partition; dorsal and anal show themselves in the middle of the tail, and unite in a point; teeth like a carding comb; six branchial rays.
  10. **SYNBRANCHUS.** *Unibranchaperture*. — Branchiæ open into a common hole under the throat; no pectorals; upright fins almost entirely adipous; head thick; muzzle rounded; six strong branchial rays.
  11. **ALABES.** — Branchial opening as above; pectorals,

between which is a small concave disk ; three branchial rays ; teeth pointed.

GENUS II. SACCOPHARYNX. *Ophiognathus*.

Body possessing the power of swelling into a thick tube, and ending in a very long, slender tail, encircled by a very shallow dorsal and anal, which unite at its point ; mouth armed with sharp teeth, and opens far behind the eyes, which are near the very short point of the muzzle ; branchiæ open into a hole under the pectorals, which are very small.

GENUS III. GYMNOTUS.

Branchial membrane opening before the pectorals ; anal extends under the greater part of the body, and generally to the end of the tail ; no dorsal.

Subgenus 1. GYMNOTUS PROPER. — No fin at the end of the tail.

2. TRUE GYMNOTUS. *Electrical Eel*. — Skin without visible scales.
3. CARAPUS. — Body compressed ; scaly tail, tapering towards the end.
4. STERNARCHUS. *Apteronotes*. — Anal terminates before it reaches the end of the tail, which has a fin ; on the back is a fleshy, soft filament, which lies in a groove and reaches as far as the tail ; it is retained in this groove by tendinous threads, which however allow it some liberty ; head oblong, naked, compressed, and neither opercula nor branchial rays are visible ; the body scaly ; the teeth soft.

GENUS IV. GYMNARCHUS.

Body long and scaly ; branchiæ open before the pectorals ; a dorsal all along the back composed of soft rays ; no anal ; tail ending in a point ; head conical and naked ; mouth small ; a single row of small teeth

## GENUS V. LEPTOCEPHALUS.

Branchiæ open in a slit before the pectorals ; body like a ribbon ; head very small ; muzzle short ; pectorals almost invisible, or none ; dorsal and anal scarcely visible, and unite at the point of the tail

GENUS VI. OPHIDIUM. *Donzelles.*

Body like a sword ; branchial openings wide ; a very distinct operculum, and a membrane with short rays ; dorsal rays articulated ; other characters like those of Eels.

Subgenus 1. OPHIDIUM PROPER. — Two pairs of small barbs.

2. FIERASFERS. — No barbs ; dorsal like a fold of skin.

GENUS VII. AMMODYTES. *Equilles.*

Body like that of Eels ; dorsal extending along a great part of the back ; anal fin and caudal forked, separated from each other ; muzzle sharp ; upper jaw extensile ; lower jaw longer than the other.

Eels are found in most countries, and are excellent eating ; but although plentiful in England, London is chiefly supplied with them from Holland ; vessels from which place often bring from fifteen to twenty thousand pounds weight of them. They seem to be even more valued in other countries than in England ; and Mr. Ellis says, that in Otaheite they are kept in holes, and so tamed as to eat out of the hand, and answer the call of a whistle. Whenever they can, they go to sea in the autumn, where they spawn, and return in the spring ; but they cannot bear cold, and very northern countries are not visited by them. Those which remain in fresh water all the winter bury themselves in the mud during the cold months.

All are restless in thunder storms, and are oviparous; the worms which infest them having been taken for their fry, and given rise to the contrary assertion. They emigrate from one piece of water to another, have been found under hay-stacks, to keep themselves warm, generally feed on insects and small fishes, and are slow of growth. Mr. Yarrell mentions a species of the common Eel which weighed twenty-seven pounds.

According to Mr. Low, the Otters of the Orkney Islands are very successful in fishing for Conger Eels. The latter hide themselves in crevices of rocks, or burrow in the ground; their flesh is not esteemed, but in former times was dried, ground to powder, and then used for thickening soup. They sometimes weigh one hundred and thirty pounds, are large, strong, and omnivorous.

The Muræna Proper is beautifully marbled, and speckled all over with brown or purple, and yellow. It was kept in ponds by the Romans, and stories are told of its being fattened on the bodies of slaves. It is extremely voracious, bites severely, lives equally well in salt or fresh water, and is very strong.

The organs which produce the electrical shocks given by the Gymnotus lie all along the back, and are divided into two sets, each composed of membranaceous plates, close to each other, one end communicating with the skin, and united by transversal plates. The little cells thus formed are filled with a jelly-like matter, and the whole apparatus is provided with many nerves. This fish, discovered in South

America by Baron Humboldt, attacks both men and horses; the latter, when wild, are driven into the streams frequented by the *Gymnotus*, and after receiving some shocks, are so frightened, that they are easily taken, but they are sometimes killed either by the violence of the shocks, or by fear. Baron Humboldt told the author that, anxious to examine one of them thoroughly, after it was supposed to be dead, he slung it round the neck of his horse, tied up in a towel, and the steed being tired, the Baron walked by its side. The motion of the horse revived the Eel; it gave a shock, and away went the horse, the fish, and the towel, and were never recovered. One which was brought alive to the Jardin du Roi in Paris shocked all the learned professors far and near, also those who were curious, or who had courage enough to touch it; and the electricity was communicated to seven persons standing hand in hand. Stories were, consequently, not wanting, in which many were said to have lost the use of their limbs, and even their lives, and which had no other foundation than the severity of the shock.

The body of the *Leptocephalus* is silvery, and almost transparent; there is one species in England, and several others in warm countries, thin as paper, and so transparent, that even its skeleton is not to be distinguished.

## ORDER V. LOPHOBRANCHIÆ.

Branchiæ divided into little tufts; body armed with plates or shields.

THE breathing hole of the Syngnathus (TABLE LXXXV.) lies towards the nape of the neck. Their eggs are contained in a sort of pocket, formed by a swelling of the skin, which they do not leave till they are hatched, when it bursts, and they come forth.

## TABLE LXXXV.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER V. LOPHOBRANCHIÆ.

## GENUS I. SYNGNATHUS.

Muzzle tubular; mouth at the end, and nearly vertical; breathing hole towards the nape of the neck.

Subgenus 1. SYNGNATHUS PROPER. *Aiguilles de mer*.—Body very long and slender; some having all the fins except the ventrals, others wanting some of them.

2. HIPPOCAMPUS. *Sea Horses, Chevaux marins*.—Body compressed, rising above the tail, and after death curving into something like the shape of a horse; the joinings of the scales form a ridge, and their angles have spines.

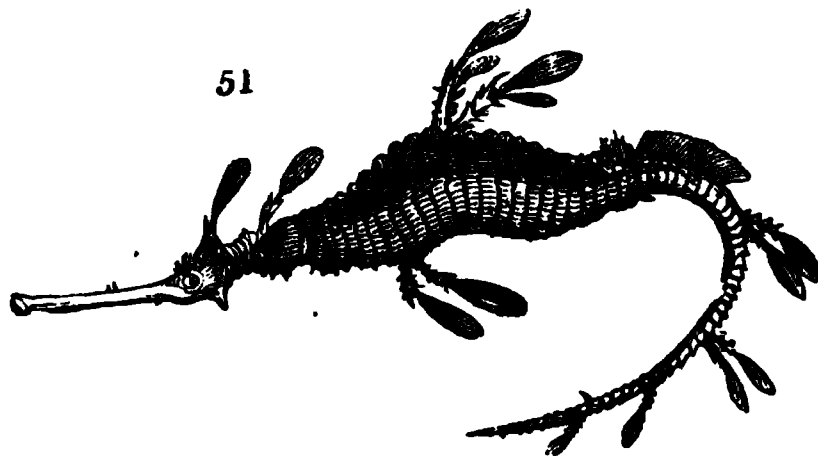
3. SOLENOSTOMA.—Very large ventrals behind the pectorals, united to each other and to the body,

so as to form a sort of apron ; one dorsal near the nape of the neck, another at the beginning of the tail ; and a large pointed caudal.

#### GENUS II. PEGASUS.

Projecting muzzle ; mouth underneath, and very protractile ; scales like the Hippocampus ; body wide and flattened ; branchial holes on the sides ; two distinct ventrals behind the pectorals, which are often large ; dorsal and anal opposite to each other.

The English Channel, the Mediterranean, the Atlantic, and Indian seas produce the Hippocampi, but those of New Holland are of still more extraordinary form than all others, as they have a number of leaf-like appendages on different parts of the body.



The tails of all are prehensile, and their eyes move independently of each other. They have frequently been found at Jersey, curled up in oyster shells.

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## ORDER VI. PLECTOGNATHES.

Jaws imperfect ; opercula hidden under the skin ; no ventrals.

## TABLE LXXXVI.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER VI. PLECTOGNATHES.

- Family 1. GYMNODONTES. — Jaws provided with an ivory substance instead of teeth, divided internally into plates, the whole resembling a parrot's beak, and which is composed of real teeth, joined together ; opercula small ; five branchial rays, much hidden.
- Family 2. SCLERODERMES. — Conical, or pyramidal muzzle, prolonged from the eyes ; ended by a small mouth, provided with a few distinct teeth in each jaw ; skin generally rough, or covered with hard scales.

## TABLE LXXXVII.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER VI. PLECTOGNATHES.

## FAMILY I. GYMNODONTES.

GENUS I. DIODON. *Globe Fish, Orbes épineux.*

Jaws consisting of one piece above, and another below ; behind the cutting edge of each is a round part, furrowed across,



and forming a powerful instrument of mastication ; skin armed in every part with thick, pointed spikes.

GENUS II. TETRAODON. *Tétrodons.*

Jaw pieces divided in the middle, so as to look like two teeth above, and two below ; small spines on the skin.

GENUS III. CEPHALUS. *Orthogoriscus, Moles, Sun Fish, Moon Fish, Poissons Lunes.*

Jaws like those of the Diodon ; body compressed ; no spines ; tail so short and deep that the fish appears to have had its hinder part cut off ; dorsal and anal deep and pointed, and join the caudal.

GENUS IV. TRIODON.

Upper jaw divided as in the Tetraodon, and the lower like that of the Diodon ; a dewlap almost as long as the body, and twice as deep, supported in front by a very large bone ; body rough, and the dewlap covered with small, rough, and oblique ridges.

THE Diodons (TABLES LXXXVI. and LXXXVII.) have the power of swelling themselves out like balloons when attacked, at which times they lie on their backs, and float on the surface of the water ; their spines, from the stretching of the skin, standing at right angles from them, and everywhere presenting a prickly surface. Their nostrils have a double tentaculum on each, and a sound proceeds from their stomach when they are taken.

The Tetrodons puff themselves out in the same manner, but they do not all possess spines; some are beautifully coloured, and have been caught on the coasts of Cornwall.

The Sun Fish has received its name from its round and shining appearance, and is found along the whole line of the British coasts, in the Atlantic, and at the Cape, &c. A thick layer of a gelatinous substance exists under the skin, and Mr. Couch says the fish is very stupid, and apt to lie asleep on the surface of the water, at which time it is easily taken. A comparatively larger species is found in Mount's Bay, Cornwall. When boiled it turns to a jelly, looks like starch when cold, and makes a good glue.

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## FAMILY II. SCLERODERMES.

Muzzle conical; a small number of teeth in each jaw.

A great number of Balistes, (see TABLE LXXXVIII.) abound in the torrid zone, on rocks nearly even with the water's edge, where they shine with the most beautiful colours; but it is dangerous to eat their flesh. One was caught off the coast of Sussex.

## TABLE LXXXVIII.

## CLASS IV. PISCES.

## Series I. FISHES PROPER.

## ORDER VI. PLECTOGNATHES.

## FAMILY II. SCLERODERMES.

## GENUS I. BALISTES.

Body compressed; eight teeth in one row on each jaw, and generally sharp; skin scaly, or grained, but not absolutely bony; first dorsal composed of one or more spikes, articulated on to a peculiar bone, which possesses a groove, into which the fin retreats; second dorsal soft, long, and opposite to a similar anal.

- Subgenus 1. **BALISTES PROPER.** *File Fish*.—The whole body covered with large and very hard scales, which join at the edges; first dorsal has three spikes, the foremost of which is the longest; the third very small and distant from the others; spines upon the body.
2. **MONACANTHUS.**—Scales very small, covered with a rough substance looking like velvet; one large spine in the first dorsal; some have a dewlap, and strong spines by the sides of the tail.
3. **ALUTÈRES.**—Body long, covered with little close knots or grains, which are scarcely perceptible; one spine in the first dorsal; no spines upon the body.
4. **TRIACANTHUS.**—Ventrals supported by a large, spiny ray; the first dorsal has three or four small spines, and after them the usual, large spine; scales small and close together; tail longer than others.

GENUS II. OSTRACION. *Coffres*.

Regular and bony compartments, forming a stiff armour all over the head and body, so that the tail, the fins, the mouth, and a sort of lip to the branchial openings, alone are movable. Many of the vertebræ adhere to each other; ten or twelve conical teeth in each jaw; gills like a slit; six branchial rays; one small dorsal, and a similar anal.

The Ostracions have but little flesh, but their liver is large, and yields oil. Some of them are suspected of being poisonous.

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## Series II. CHONDROPTERYGII WITH FREE BRANCHIÆ.

One orifice for a gill, furnished with an operculum, but no rays

SEVERAL of the fishes of this order (see TABLE LXXXIX.), in more than one instance, approach reptiles, and others are so little organised, that it is difficult to consider them as vertebrated animals. There are no bony fibres in their skeleton; their heads are formed of only one piece; they have only vestiges of jaw bones, hidden under the skin; and the gelatinous substance which fills the intervals of the vertebræ in other fishes, and runs through them by means of a small hole, in several of the Chondropterygii, is like a cord of the same size throughout.

## TABLE LXXXIX.

## CLASS IV. PISCES.

## Series II. CHONDROPTERYGII.

ORDER I. STURIONES. *Chondropterygii with free Branchiæ.*GENUS I. ACCIPENSER. *Sturgeon, Esturgeons.*

Body more or less covered with bony shields, placed on the skin in longitudinal rows; head covered with the same substance; mouth small, placed under the muzzle, and very protractile; no teeth; barbs; branchiæ opening into a hole; dorsal placed behind the ventrals, and the anal under it; the caudal surrounds the end of the spine, and has a projecting lobe underneath.

GENUS II. SPATULARIA. *Polyodons.*

An enormous prolongation of the muzzle with the edges widened like a leaf; form and position of fins as above; gills more open, and operculum prolonged to the middle of the body in a membranous point; mouth much cleft; teeth small.

## GENUS III. CHIMÆRA.

Branchiæ really opening into five holes, but only one is external; a mere vestige of an operculum under the skin; jaws imperfect; hard, undivided plates instead of teeth, four above, and two below; muzzle projects in front, and is pierced with pores in regular lines; the first dorsal has a strong spike and is placed above the pectorals. The male fish has bony appendages to the ventrals, divided into three branches, and two spiny plates before the base of the same fin; a piece of flesh between the eyes ends in a groupe of small spikes.

Subgenus 1. CHIMÆRA PROPER. — Muzzle simply conical; second dorsal begins directly behind the first,

and reaches to the end of the tail, which is prolonged into a filament ; another fin underneath.

Subgenus 2. *Callorhyncus*. *Callorinques*. — Muzzle terminated by a fleshy strap, similar to a hoe ; the second dorsal begins opposite the ventrals, and ends over the commencement of the fin under the tail.

Among the Chondropterygii with free branchiæ is the Sturgeon, whose large swimming bladder, so famed for making isinglass, communicates with the gullet by means of a large hole. They ascend rivers for a short distance ; their flesh is good, close and compact, and best about the head ; their eggs are small, and are made into the true caviar. They are never caught in the sea, and are supposed to live in depths too profound to be reached by the fisherman. Henry the First reserved for himself all the Sturgeons caught in England, but now only those taken within the jurisdiction of the Lord Mayor are considered as Royal fish. One was found in the Esk which weighed 460lbs.

The eggs of the Chimæra are large and leathery, with flat edges like velvet. This fish pursues the shoals of Herrings, also eats Mollusca and Crustacea. Their liver yields an oil, which the Norwegians consider good for disorders of the eyes.

ORDER II. CHONDROPTERYGII WITH FIXED  
BRANCHIÆ.

The fishes of this order (see TABLES XC. and XCI.) frequently have arched bones suspended in the flesh, opposite the external edges of the branchiæ, like vestiges of branchial supports.

TABLE XC.

CLASS IV. PISCES.

Series II. CHONDROPTERYGII.

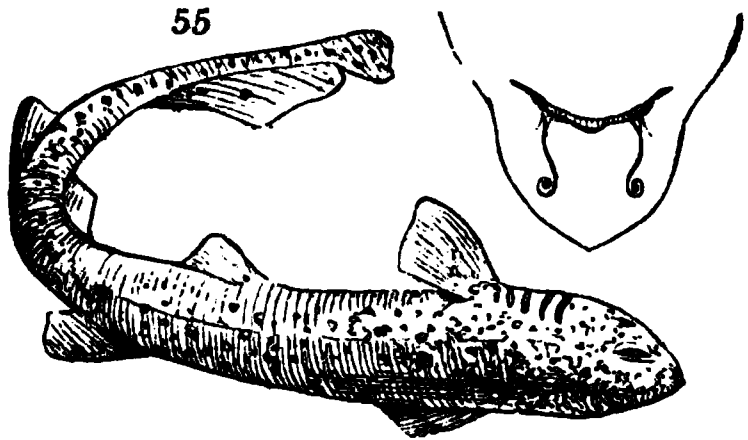
ORDER II. CHONDROPTERYGII WITH FIXED  
BRANCHIÆ.

- Families 1. SELACIANS. *Plagiostomus*. — Jaws imperfect, but armed with teeth; branchial rays not apparent; no opercula; ventrals behind the belly.
2. CYCLOSTOMA. *Suckers*. *Suceurs*. — Skeleton imperfect; no pectorals; no ventrals; body long, ending in front in a circular or semi-circular lip, supported by a cartilaginous ring, which results from the joining together of the jaw bones; a tendinous chord passes through the vertebræ, which are reduced to mere cartilaginous rings; nostrils opening in one hole, before which is a cavity.

## FAMILY I. SELACIANS.

Edges of the branchiæ adhere to the outer skin, and the water escapes through a series of holes.

The first family, called Selacians, have only rudiments of the usual jaw bones ; and they have branchial rays attached to the tongue bone as in other fishes, though they do not appear outside. Several are viviparous ; others produce eggs covered with a yellow, transparent horn, the angles of which are much prolonged. Their leathery flesh is only eaten by those who cannot afford better food. When speaking of their young, Mr. Yarrell says, "From each of the branchial apertures, filaments project externally ; each filament contains a single, minute, reflected vessel, in which the blood is thus submitted to the action of the surrounding medium. These appendages are only temporary, and the blood of the fish is aerated by the true gills." This strongly resembles the Batrachian reptiles. The females are the largest ; all are tenacious of life, and the cabinet-makers use their skin for polishing hard wood.



Their teeth are most formidable, set in double rows, and "the outside tooth in the front of each jaw is supported on the inside by various other teeth, which supply deficiencies as necessity may require. Several species frequent the English shores."



TABLE XCI

CLASS IV. PISCES.

Series II. CHONDROPTERYGII.

ORDER II. CHONDROPTERYGII WITH FIXED  
BRANCHIÆ.

FAMILY I. SELACIANS.

GENUS I. SQUALUS. *Shark.*

Body long ; tail thick and fleshy ; pectorals moderate ; branchial openings at the sides ; eyes on the sides of the head ; muzzle supported by three cartilaginous branches.

- Subgenus 1. SCYLLIUM. *Roussettes.* — Muzzle short and obtuse ; nostrils near the mouth, continued in a furrow to the edge of the lip, and more or less closed by one or two lobes of skin ; dorsals placed far back, the first over the ventrals ; caudal long and not forked ; branchial openings partly over the pectorals.
2. SQUALUS PROPER. — Muzzle projecting. The caudal has a lobe which renders it more or less forked.
3. CAECHARIAS. *Requins.* — No vents ; anal fin ; teeth sharp, pointed, and often notched ; first dorsal before the ventrals ; the second over the anal ; muzzle flattened ; nostrils in the middle ; branchial holes over the pectorals.
4. LAMNA. *Lamies, Touilles.* — Muzzle pyramidal ; nostrils under its base ; branchial holes before the pectorals ; no vents ; anal fin.
5. GALEUS. *Milandres.* — Vents ; anal fin ; teeth notched at the outer edge.
6. MUSTELUS. *Emissoles.* — Vents ; anal fin ; teeth like pavement.

Subgenus 7. **NOTIDANUS.** *Grisets.*—No dorsal; other characters as above.

8. **SELACHE.** *Pélerins.*—Branchial openings almost encircle the neck; teeth small, conical, and not notched; other characters as above.
9. **CESTRACIONS.**—A spine in front of each dorsal; jaws pointed; small pointed teeth in the middle, and some larger at the angles; in other respects like *Mustelus*.
10. **SPINAX.** *Aiguillats.*—Vents; no anal; several rows of small, sharp teeth; a strong spine before each dorsal.
11. **CENTRINA.** *Humantins.*—Vents; no anal; second dorsal over ventrals; tail short; lower teeth sharp, and in one or two rows; skin very rough.
12. **SCYMNUS.** *Leiches.*—As above; but no dorsal spines.

**GENUS II. ZYGÆNA.** *Sphyrna, Hammer-headed Sharks, Marteaux.*

Characters of Sharks, with the head horizontally flattened, ending suddenly in front, and the sides prolonged in the shape of a hammer; the eyes placed at the extremities, and nostrils in front.

**GENUS III. SQUATINA.** *Angel Fish, Shark Ray, Anges.*

Vents; no anal; mouth at the end of the muzzle; head round; body wide and flattened; pectorals large; a slit behind them in which are the branchial openings; both dorsals behind the ventrals; caudal above and below the tail.

**GENUS IV. PRISTIS.** *Saw Fish, Scies.*

Form of Sharks, but flatter; branchial openings underneath; a very long, flattened muzzle, like the blade of a sword, having bony spikes on each side, which are pointed, sharp, and set like teeth; the real teeth are like pavement.

GENUS V. *RAIA*. *Ray, Raies*.

Body flattened; pectorals very large and fleshy, joined to each other, or to the muzzle, and extending along the sides of the belly, to the base of the ventrals; eyes and vents placed on the dorsal surface; nostrils and branchial openings on the belly side; dorsal almost always placed upon the tail.

Subgenus 1. *RHINOBATUS*. — Tail thick and fleshy, bearing two dorsals and a caudal; muzzle sharp in front, and small; teeth like pavement.

2. *RHINA*. — Muzzle short, wider, and round; other characters as above.

3. *TORPEDO*. *Electric Ray, Torpilles*. — Tail short and fleshy; body nearly circular; the muzzle having enlargements which reach the pectorals; small, membranous tubes, like honeycomb, full of mucous matter and abounding in nerves, between the pectorals, the head, and the branchiæ; body smooth; teeth small and pointed; power of giving electric shocks.

4. *RAIA PROPER*. *Ray, Skate*. — Tail thin; two small dorsals, and sometimes the vestige of a caudal at the end; teeth thin and close together on the jaws; head enveloped in pectorals.

5. *TRYGON*. *Pastenagues*. — Tail armed with a spike, which is dentated like a saw on each side; head enveloped in the pectorals; some have a slender tail with a fold like a fin.

6. *ANACANTHUS*. — As above, but neither fin nor spike.

7. *MYLIOBATIS*. *Mourines*. — Head projecting beyond the pectorals, making it look like a bird with extended wings; large, flat teeth like pavement; tail very long and slender, armed with a saw-like spike, and before it one or two small dorsals.

Subgenus 8. RHINOPTERA. — Muzzle divided into two short lobes.

9. CEPHALOPTERA. — Tail, spike, dorsal, and pectorals like *Myliobates*, but teeth thinner, and finely notched ; head suddenly ending in front, and the pectorals, by the prolongation of their extreme point, look like horns.

“ The Greenland Shark is the most formidable enemy of the whale, bites it while alive, and feeds on it when dead ; its heart is very small, and it is but little sensible to pain ; for, after having been run through with a knife, it will return to its banquet, and it is extremely difficult to kill.” \* Sharks abound in warm climates, go far up rivers, follow vessels, and are the terror of those on the coasts. These fearful animals watch for the negroes on the shores of Africa, who, in spite of their vicinity, bathe in the sea, and are often killed by them. The author was one day standing at a window, and seeing a large shark rapidly approach the spot where some black men were swimming, sent to warn them of their danger. All came ashore but one, who laughed at the fears of his companions. She again sent, and tried to bribe him back with a bottle of rum ; but before he could come to land, the shark had seized him, and the water was dyed with his blood. A wave threw him ashore, and medical assistance was at hand ; he, however, died in three minutes, for his thigh bone was taken completely away, and cleared from the socket at the hip.

\* Captain Scoresby.

H H

The Hammer-headed Shark has an unique appearance among animals ; its young are eaten by the poorer classes ; but the flesh of all old Sharks is extremely unpalatable.

The Saw-fish is another enemy to the whale, and attacks the largest species with its formidable muzzle.

The Torpedo has been long celebrated for the violent electrical shocks which it has the power of giving, and which probably are used as a means of catching prey, as well as defence. Mr. Couch thinks that they render the food more liable to speedy decomposition ; and so accommodate it to the short intestine of this animal. It was recommended by the physician of Antony and Cleopatra as a medicine for headaches. It is only those parts which are influenced by the brain and heart which give the shock, and if the fish be divided in the middle, the fore part alone will retain this property.

Most persons who have eaten the Skate will be able to form a good idea of the bones of cartilaginous fishes. These defend themselves, when attacked, by bending the nose and tail upwards, and lashing the latter about in all directions, so as to wound with its sharp spines. Some of the teeth of the male alter with age, and become sharper.

The eggs of Rays are covered with a brown, leathery substance, prolonged at the angles, and looking like a hand-barrow. The shells are constantly floating on the sea, and are thrown upon the shore, where they receive a number of local names.

## FAMILY II. CYCLOSTOMA.

No pectoral or ventral fins; body elongated, ending in a circular, or semicircular lip.

## TABLE XCII.

## CLASS IV. PISCES.

## Series II. CHONDROPTERYGII.

## ORDER II. CHONDROPTERYGII WITH FIXED BRANCHIÆ.

## FAMILY II. CYCLOSTOMA.

GENUS I. PETROMYZON. *Lamprey, Lamproyes*

Seven branchial openings on each side; skin raised above and below the tail, in a longitudinal crest, like a fin, the rays of which are scarcely visible.

Subgenus 1. PETROMYZON PROPER. — Maxillary ring armed with strong teeth; and hard tubercles, similar to teeth, more or less abound in the inner part of the lip, which is circular; two longitudinal rows of small teeth on the tongue; a dorsal placed before the tail, and another behind it, which joins the tail fin.

## GENUS II. MYXINE.

One tooth at the top of the maxillary ring, which itself is membranous; mouth circular, surrounded by eight barbs; a vent on the upper edge; body cylindrical, provided with a fin behind, which goes round the tail.

Subgenus 1. HEPTATEMUS. — Seven branchial holes on each side.

Subgenus 2. **GASTROBRANCHUS.** — The branchiæ have a common channel on each side, ending in two holes under the heart, at about one third of their whole length.

3. **AMMOCETES.** — The whole skeleton so soft and membranous as to make the fish appear to have no bones; general form and branchial holes like those of Lampreys, but the lip semi-circular; no teeth; mouth provided with a row of small and branching barbs; dorsals united to each other, and to the caudal, like a shallow, sinuous fold.

4. **AMPHIOXUS.** *Lancelet.* — Sides flattened and striated; no eyes; one dorsal fin; mouth under the muzzle; mouth surrounded by filaments.

Lampreys (see TABLE XCII.) fix themselves by suction upon stones and other solid bodies, and attack large fishes in this manner, which they devour in a short space of time. The great Lamprey, celebrated for causing the indigestion and consequent death of Henry I., is oviparous; is a northern fish in both hemispheres, and particularly abounds in the Severn. It deposits its eggs in rivers, and sometimes measures more than two feet in length. It is eaten potted, or stewed, but is by no means wholesome. The Lampern is much more so, and is also potted. Some years back, when it was more plentiful in the Thames than it is now, it was purchased by the Dutch as baits for their fisheries, and the Thames alone supplied twelve hundred thousand Lamperns every year. All the species of Lamprey are very tenacious of life.

The Myxine looks more like a worm than a fish ; has no eyes, and so much mucus exudes from the pores of its lateral line, that the mud in which it lives seems to be converted into jelly. It attacks and destroys by suction.

The Ammocetes lives in the mud of streams. Mr. Yarrell has rescued the Lancelet from the class of worms to place it among the fishes, to which it certainly belongs. It is so transparent, that its intestines may be seen through its sides, which are striated. The dorsal fin is delicate and membranous ; the dorsal column is flexible and cartilaginous, and the fish is very active.





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THE END.



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## ERRATA.

- Page 243. line 9. from bottom, for "*Boot-bills*" read "*Boat-bills*."
251. line 9. from bottom, for "*Holopodius, Feet of Phalaropus.*  
— Beak of Totanus." read "*Holopodius. — Feet*  
of Phalaropus ; beak of Totanus."
270. line 5. from bottom, for "*Teras*," read "*Terns*."
281. line 10. from bottom, for "*Claugula*" read "*Clangula*."
295. line 10. for "*Fouette, Queue*" read "*Fouette- Queue*."
338. line 12. from bottom, for "PHARYNGII. *Labyrinthi-*  
*formes*." read "PHARYNGII-LABYRIN-  
THIFORMES."
349. line 12. from bottom, after "long" insert a comma.



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